

CHAPTER 3

Affected Environment

3. AFFECTED ENVIRONMENT

This chapter describes the existing physical, biological, social, and economic characteristics of the Sloan Canyon National Conservation Area (NCA) and its associated planning area. The affected environment defines the baseline of existing conditions from which possible impacts of the plan may be analyzed. The baseline data were provided by the Bureau of Land Management (BLM) Las Vegas Field Office; federal, State, county, tribes, and local agencies; various organizations; field surveys; and other public and private sources. Data sources include published and unpublished reports, maps, geographic information systems (GIS), and field observations.

3.1 PHYSIOGRAPHY

The Sloan Canyon NCA is located in the northern half of the McCullough Range, in the northeastern portion of the Mojave Desert. The basin and range topography typical of the Great Basin is prevalent on a local scale, especially along the eastern front of the range. The northern end of the McCullough Range has a vertical relief of more than 2,500 feet, rising above surrounding valleys to a high point of 5,000 feet at Black Mountain.

A long escarpment or steep slope dominates the topography of the northern portion of the McCullough Range, with the eastern slopes much steeper than the western slopes. The escarpment was formed during a series of volcanic flows, with the record of these flows preserved because of the minimal faulting (Purkey 1994). Hidden Valley, located at the southwest corner of the NCA, represents a broad depression containing deep wind-blown sand deposits.

No perennial streams are located within the northern portion of McCullough Range; however, there are several small springs and seeps and numerous dry washes. These washes may experience surface flows during precipitation events.

3.2 CLIMATE

The eastern Mojave Desert is one of the most arid regions in North America. The region generally experiences hot summers, mild winters, and wide daily temperature fluctuations caused by the radiation of daytime surface heat into evening skies. Average daily maximum temperatures range from 104 °F in July to 56 °F in January, although summer temperatures of 115 °F are not uncommon within the NCA, and temperatures over 120 °F can occur. The average daily minimum temperature ranges from 75 °F in July to 33 °F in January. Winters are generally mild; however, freezing temperatures do occur with some regularity (U.S. Weather Service 2004).

The average annual precipitation in the Sloan Canyon NCA area is about 4.5 inches, and it often occurs during monsoon-driven heavy thunderstorms accompanied by flash flooding. Much of this precipitation is subsequently lost to evaporation, which is accelerated by low relative humidity and strong winds.

A variety of factors affect weather patterns in southern Nevada. Most of the area experiences relatively stable fair weather conditions resulting from high-pressure systems over the Great Basin (MacMahon 1997). Periodic weather changes occur, affected by a stream of westerly winds blowing over the area during the winter months. Occasionally, cold temperatures and snowfall are produced by winter low-pressure systems. Winds from the west are lighter in the summer months, and subtropical high-pressure systems moving northward have a stronger influence on regional weather during this season. Although

intense storms occur, monsoonal moisture from the south is significantly diminished by the time it reaches Nevada, resulting in clear and relatively dry summers (MacMahon 1997, Speck 1982).

3.3 RECREATION

Recreation use in the NCA area historically has been dispersed and at low to moderate levels; however, it has increased along the urban interface with the growth of the Las Vegas Valley population. In general, the NCA has few roads, routes, trails, or facilities to support recreation. Activities such as hiking and off-highway vehicle (OHV) riding have been and continue to be the predominate uses within the NCA. Recreationists are frequently long-time users of specific locations, largely self-sufficient, and may be unaware of the relatively recent NCA designation.

Before passage of the Sloan Canyon NCA Act, the *Proposed Las Vegas Resource Management Plan and Final Environmental Impact Statement (Las Vegas RMP)* (BLM 1998a) guided management of recreation in the North McCullough Range, although few decisions provide specific direction for the land currently within the NCA. The *Clark County Multiple Species Habitat Conservation Plan (MSHCP)* (Clark County Department of Comprehensive Planning [CCDCP] 2000) provides additional management direction for conservation within the NCA. Administrative actions taken through the *Las Vegas RMP* (BLM 1988a) closed portions of the NCA to shooting, camping, and OHV use (Figure 3.1).

BLM began visitor use observations in November 2003 to track visitor numbers, determine types of visitors, and discern daily and seasonal recreation activities. The number of visitors was recorded daily between November 2003 and July 2004 at several spots throughout the NCA, including Hidden Valley, the Sloan Canyon Petroglyph Site and the northeast corner of the NCA. During this observation period, approximately 4,000 visitors were counted within the NCA (one visitor equals one person recreating in the NCA for any amount of time in the course of 1 day). This total equates to an average of 15 visitors per day. Visitor patterns indicated peak visitation (15 to 35 visits per day) on weekends and lower use (5 to 15 visits per day) on weekdays. Extrapolated to a full calendar year, the observed visitor total would be approximately 5,500 annual visits. For purposes of planning and analysis, it was assumed that actual visitation is five times higher than the observed. Hence current visitation is estimated to be about 28,000 visitors per year.

Even without the development of additional visitor facilities, visitation is expected to increase as the NCA becomes better known, the regional population grows, and surrounding development grows closer to the NCA boundary. The current annual growth rate in Clark County is 4 percent (Clark County 2003a). If this constant growth rate were applied to NCA visitation, total visitation in 2030 would be roughly 75,000. However, other factors could increase visitation to considerably higher levels. For example, Las Vegas has numerous weekly and monthly publications that list “things to do,” including visiting natural areas such as Red Rock Canyon NCA and Valley of Fire State Park. The Sloan Canyon NCA is not currently listed in these publications but may be in the future, and visitation is expected to increase dramatically.

Although the precise numbers of visitors participating in specific activities are unknown, general patterns have been derived through visitor observations throughout the NCA. Because of the rugged terrain and distinct natural boundaries within the NCA, recreation use is discussed below by geographic area, and associated recreational disturbance is presented in Figure 3.2.

Figure 3.1. BLM Las Vegas Office Shooting, Camping, and OHV Closures

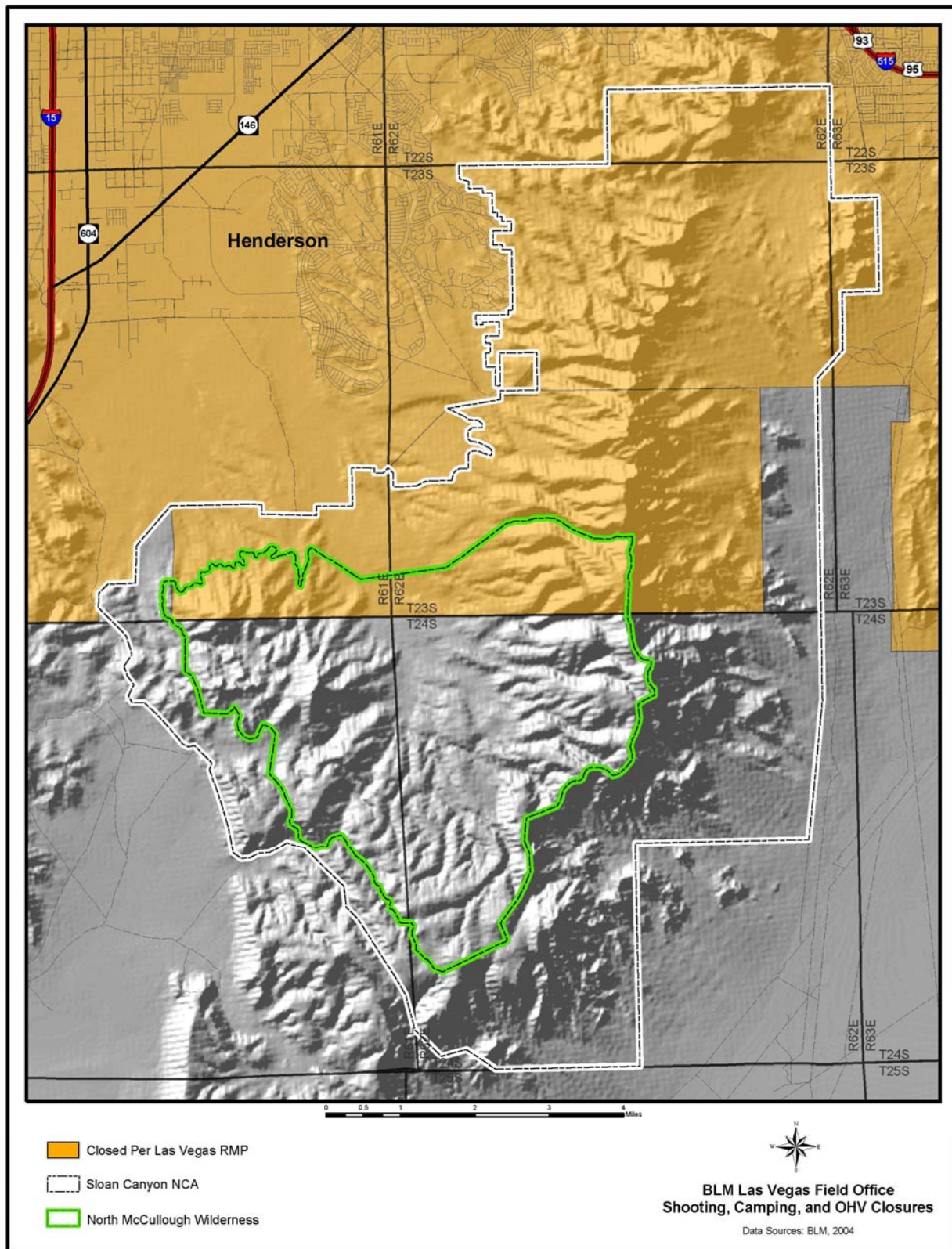
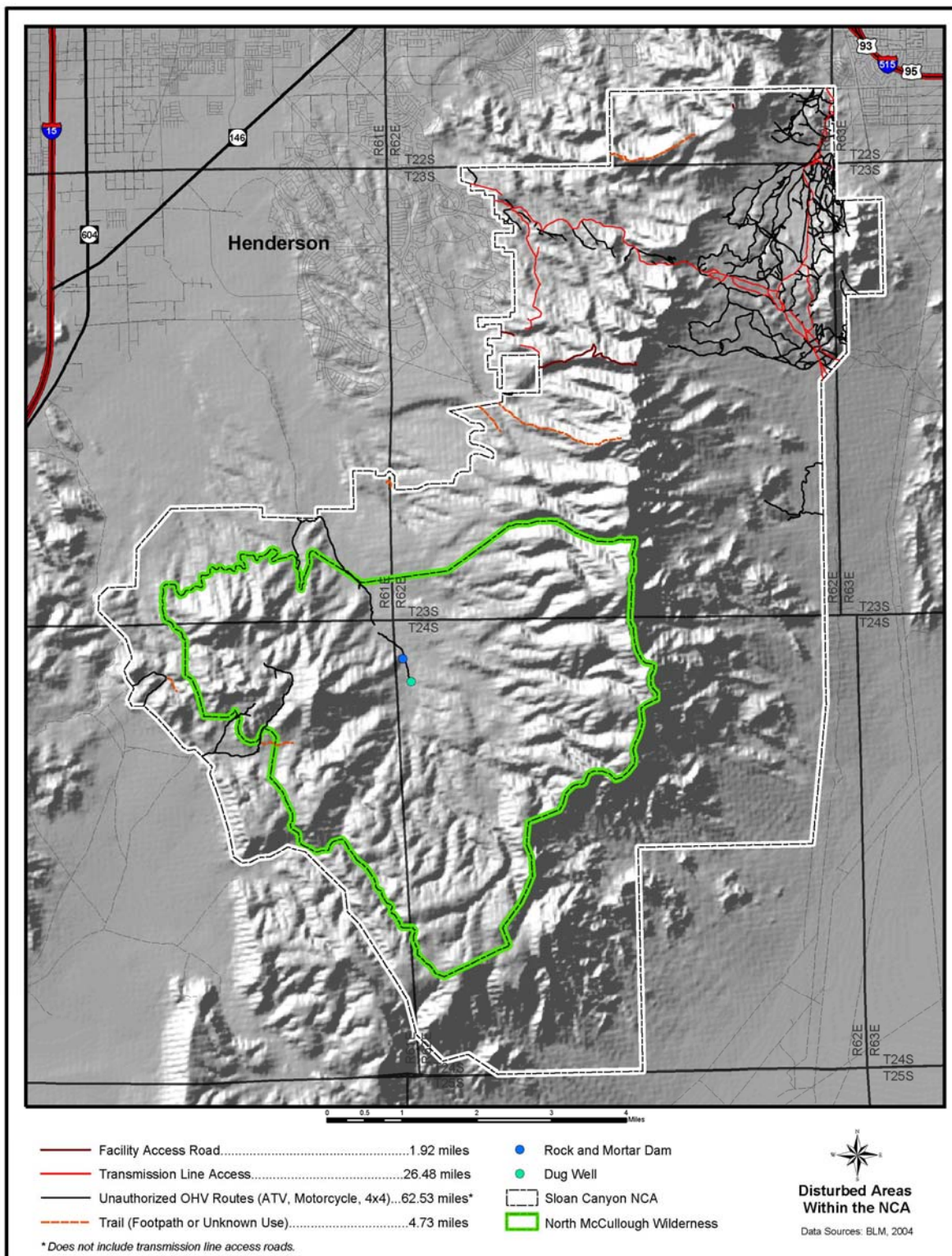


Figure 3.2. Disturbed Areas within the NCA



3.3.1 Recreation Use by Area

3.3.1.1 Northwestern NCA

Because of rugged terrain and rocky soils, recreation in the northwestern portion of the NCA is largely restricted to nonmotorized uses, except at a few access points. Motorized access to this area is primarily through the East-West Power Line Road and through the Eastern Avenue extension to the Black Mountain Communication Site Road. Other recreationists access this area on foot from adjacent neighborhoods in the City of Henderson. A small number of unofficial trails, which were developed without BLM approval, are known to exist in this area of the NCA. Current use of these unofficial trails is thought to be nearly all hiking, with limited amounts of mountain biking and horseback riding.

The northwestern area receives low but unknown levels of recreation use. Continually changing access and urban patterns may influence the timing and amount of recreation in the area. Overall demand for dispersed recreation use is expected to increase as the urban interface adjacent to the NCA stabilizes. Regional trail-planning efforts by other federal agencies, the City of Henderson, and other local communities would likely present opportunities to develop integrated trail systems.

3.3.1.2 Northeastern NCA

OHV use is the primary recreation activity in the northeastern portion of the NCA. The basin in the far northeast corner of the NCA has been heavily used by motorcycles, OHVs, and four-wheel-drive vehicles and contains numerous existing routes and trails. Large portions of this area are experiencing resource damage from braided routes, steep grades, and the pioneering of new routes. None of the routes in the area are maintained by BLM, however two roads associated with the north-south and east-west power lines receive limited maintenance by the Nevada Power Company.

Because of the relatively easy access, recreational target shooting also occurs in this area, and trash and debris dumping are widespread. Bighorn sheep in the area may be of interest for wildlife watching and for Nevada Department of Wildlife (NDOW)-permitted hunting. In addition, a limited amount of hiking occurs around numerous small peaks along the NCA's eastern boundary.

3.3.1.3 North McCullough Wilderness and Surrounding NCA

The North McCullough Wilderness encompasses the Sloan Canyon Petroglyph Site as well as a broad desert basin that is surrounded by portions of the North McCullough Range, which delineates the Wilderness boundary. The Wilderness receives low levels of dispersed use because of its rugged terrain and prohibition of vehicles. The majority of recreationists use the Wilderness when they visit the Sloan Canyon Petroglyph Site, which is usually accessed from the north via the Sloan Canyon wash. Visitation to the Sloan Canyon Petroglyph Site increased with the NCA designation, and large parties, including organized hiking groups, visit the site. Hiking and horseback riding opportunities abound within the Wilderness, and destinations frequently include the Sutor and Hanna Peaks, the North McCullough escarpment, and the Sloan Canyon Petroglyph Site. There are also numerous opportunities for wildlife watching, hunting, and dispersed camping in the Wilderness.

On its western and northern boundary, rugged terrain and rocky soils discourage illegal vehicular access into the Wilderness. A small amount of motorized use of the Wilderness is known to be occurring in Hidden Valley near the southern access to the Sloan Canyon Petroglyph Site.

A small perimeter of NCA lands lies outside the North McCullough Wilderness on its north, west, and southwest boundaries. In these areas, minor amounts of recreational target shooting and OHV use occur.

Limited amounts of dispersed camping and wildlife-watching opportunities also exist in this area. Access to the Wilderness and this perimeter area is limited to a few routes, which lie mostly outside the NCA boundary.

Visitor use has not been closely monitored in the Wilderness and surrounding NCA. On the basis of limited monitoring in 2003–2004, preliminary visitor estimates within the Wilderness indicate approximately 5 to 10 persons accessing the Sloan Canyon Petroglyph Site per weekday, with slightly higher visitation on weekend days. Outside the Wilderness, limited visitor use observation indicates moderate levels of OHV use, hiking, and occasional camping.

3.3.1.4 Southeastern NCA

Minor recreation use occurs in the southeastern portion of the NCA. Rugged terrain, rocky soils, and very few roads, routes, or trails preclude easy access. In addition, few well-known points of interest are in the area. The area is primarily suitable for hiking, with very limited amounts of four-wheel drive access to the extreme southeast corner of the NCA. Levels of recreation use in this area have not been monitored and are thought to be extremely low.

3.3.2 Special Recreation Permits

Currently, no special recreation permits are issued or under review within the Sloan Canyon NCA.

3.4 NORTH MCCULLOUGH WILDERNESS

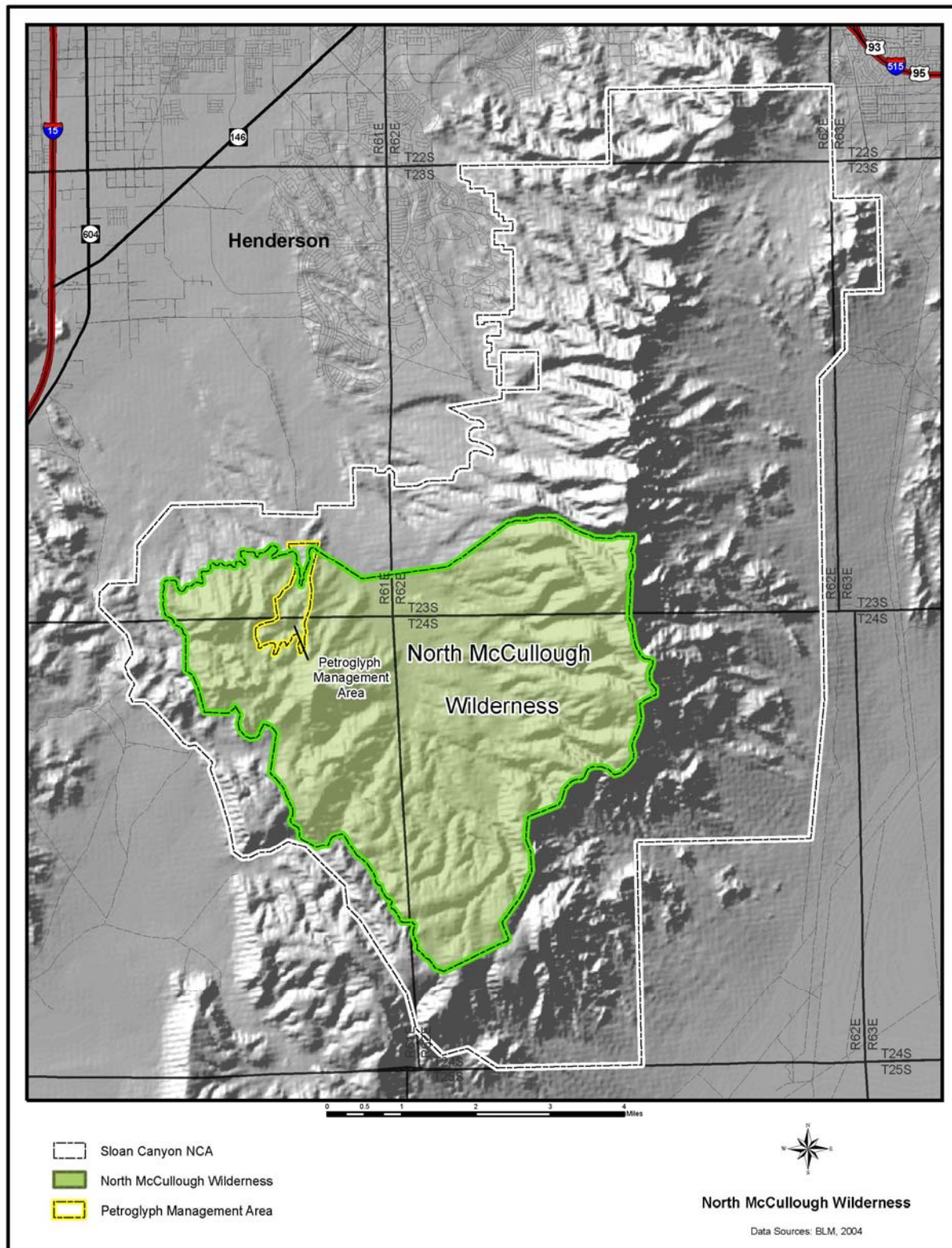
The Clark County Act, Title II (“Wilderness Areas”) designated the North McCullough Wilderness on November 6, 2002. Before designation, most of the current Wilderness was part of the 47,166-acre North McCullough Wilderness Study Area (WSA). The 14,765-acre North McCullough Wilderness is located entirely within the southwest portion of the NCA, in the northern half of the McCullough Range (Figure 3.3). This Wilderness is a unique component of the National Wilderness Preservation System because it is fewer than 15 miles south of the rapidly growing city of Las Vegas.

The North McCullough Wilderness is located to the south and immediately adjacent to the Las Vegas Valley, in the north half of the north-south-trending McCullough Range (Figure 3.3). It is roughly triangular in shape and spans approximately 6 miles at its longest and widest points. The eastern boundary follows the crest of the escarpment, the base of which forms the eastern edge of the NCA. The volcanic features that rim Hidden Valley define the western boundary. The northern boundary crosses the Sutor Hills, Sloan Canyon, and a large basin that contains the Sloan Canyon Petroglyph Site and other prominent features, such as Sutor and Hanna Peaks. The massive, rounded to flat-topped volcanic peaks have a gradual western slope. The Wilderness interior is composed of a broad, 2-mile wide central valley separating the main ridgeline to the east, from the rugged Sutor Hills. Elevations range from 2,850 feet at the lower end of the central valley to 5,058 feet at the ridgeline of the McCullough Range on the east side of the Wilderness.

3.4.1 Wilderness Characteristics: Naturalness, Solitude, and Opportunities for Primitive and Unconfined Recreation

The quality of the wilderness values were a key consideration in designating the North McCullough Wilderness. The Wilderness appears natural, but there are a few signs of human use (i.e., disturbances,

Figure 3.3. North McCullough Wilderness



developments) introduced into the environment before the area's designation. These include two-track vehicle routes, rock and motor dam, dug well, and a wildlife water development (guzzler).

Despite its proximity to a largely populated urban area, the portion of the Wilderness outside the Petroglyph Management Area possesses good solitude opportunities because of the historically low levels of visitor use; lack of trails and other developments; and topography that provides some natural screening from the adjacent urban area or other Wilderness users. A lesser degree of solitude is available within the Petroglyph Management Area as this is the heaviest-visited area within the Wilderness. The primeval character of the entire Wilderness is essentially intact except for the occurrence of some introduced plants, primarily annual grasses.

3.4.2 Resource Conditions

The North McCullough Wilderness consists of the Mojave Desert scrub vegetative community. This community is primarily composed of low, widely spaced shrubs, including the creosote bush (*Larrea tridentata*) and the white bursage (*Ambrosia dumosa*). Other affiliated community shrubs include ephedra (*Ephedra* spp.); brittlebrush (*Encelia virginensis*); burro bush (*Hymenoclea salsola*); sweetbush, or bebbia (*Bebbia juncea*); and desert saltbush (*Atriplex polycarpa*). Characteristic species associated with the Mojave Desert include Mojave yucca (*Yucca schidigera*), teddybear cholla (*Opuntia bigelovii*), and hedgehog cacti (*Echinocereus* spp.). Short-lived annual and perennial wild flowers appear in late March, April, and May, and when prompted by winter rains.

Four vegetation associations are represented within the Sloan Canyon NCA and the Wilderness: volcanic basalt slope, moderate creosote (greater than 30 percent cover), sparse creosote/bursage mix, and desert wash (BLM 2004e). Detailed descriptions of the vegetation associations are included in Section 3.12 and Figure 3.10 of the Sloan Canyon Resource Management Plan (RMP)/Environmental Impact Statement (EIS).

Although only one vegetative community, Mojave Desert scrub, is represented in the Wilderness, it supports a variety of wildlife species, including desert bighorn sheep (*Ovis canadensis nelsoni*), Gila monster (*Heloderma suspectum cinctum*), and chuckwalla (*Sauromalus obesus*). The primary natural factors that influence populations and distribution of wildlife are water availability, vegetation, topography, and weather patterns. To date, the actual number of wildlife species occurring within the Wilderness is unknown, however vertebrate wildlife species found within Wilderness borders represent three major classes: reptiles, birds, and mammals.

Wildlife Special Status Species include species federally listed as Threatened and Endangered, Proposed for Listing, or Candidates for Listing under the Endangered Species Act (ESA). They also include species designated by each BLM State Director as Sensitive and those listed, or proposed for listing, by a State in a category implying potential endangerment or extinction. Presently the Mojave population of the desert tortoise (*Gopherus agassizii*) is listed as Threatened and is the only federally protected species located in the NCA and potentially within the Wilderness (United States Fish and Wildlife Service [USFWS] 2003). A listing of wildlife Special Status Species that may be found in the North McCullough Wilderness is presented in Table 3.6 of the Sloan Canyon RMP/EIS.

No natural perennial water sources exist within the Wilderness, but high-intensity thunderstorms can produce rapid runoff and flash flooding. Sloan Canyon hosts an ephemeral stream, where water is found in the channel only during and immediately after rainstorms. The North McCullough Slickrock Catchment #1 (Project 4916) is the only wildlife water development (guzzler) within the Wilderness and was installed before Wilderness designation, while the area was a WSA.

Motorized access to the Wilderness is limited to several vehicle routes approaching from the northwest in the Sloan Canyon area and the southwest from Hidden Valley. These routes access Sloan Canyon and the wash leading to the Sloan Canyon Petroglyph Site. Other access to the Wilderness boundary is by off-trail hiking or horseback riding, because no formal trails, trailheads, or associated developments are adjacent to or within the Wilderness. For the most part, rugged and rocky terrain discourages unauthorized vehicular access into the Wilderness. A small amount of unauthorized motorized use of the Wilderness has occurred at the Hidden Valley side, near the southern access to the Sloan Canyon Petroglyph Site.

No areas of high mineral resource potential have been identified in the Wilderness. There are no mineral leases and only one current but undeveloped claim intruding slightly into the northwest portion of North McCullough Wilderness. The validity of the claim has not been determined.

Low-level aircraft flights occur over the Wilderness. The highest percentage of low-level overflights is from scenic tours originating from local-area airports, although private flights from Henderson Executive Airport, located several miles from the northern Wilderness boundary, also contribute. In addition commercial flights from McCarran International Airport pass directly over the Wilderness, although they tend to be localized to the western edge and at an altitude of more than 4,000 feet. Legislation currently before Congress proposes a future heliport located west of the NCA and mandates a 2-mile wide helicopter flight corridor over the Wilderness. The legislation would allow helicopter overflights over the Wilderness at elevations between 500 and 1,000 feet above ground. As proposed, about 90 round trip overflights a day, equating to a flight about every 4 minutes, could emanate from the heliport.

The Hidden Valley Allotment is currently open to livestock grazing. A portion of this ephemeral allotment lies within the North McCullough Wilderness, but because of the rugged terrain and lack of water, cattle typically do not wander into the Wilderness. Within this portion of the allotment, there are no developments associated with livestock grazing.

Wildland fires in the vicinity of the North McCullough Wilderness generally occur in the summer but are not uncommon in the spring, and they occasionally occur late into the fall months. Within the Wilderness, however, there are few recent wildland fire occurrences. This lack of fire is attributed to the sparseness and low stature of the shrub vegetation. Even in years of ephemeral buildup of non-native annual grasses, the rockiness of the terrain and discontinuity of the fuel bed minimizes the risk of wildland fire spread.

3.4.3 Wilderness Recreation Use

The currently low levels of recreation use within the North McCullough Wilderness are expected to increase with the rapid growth rate of the Las Vegas Valley and as information about recreational opportunities within the Wilderness and NCA becomes more available. Except for some recent monitoring of visitation to the Sloan Canyon Petroglyph Site, visitor use has not been closely monitored.

Generally the Wilderness receives low levels of dispersed recreational use, primarily because of its rugged terrain and limited vehicle access to its boundary. There are opportunities for wildlife watching and permitted hunting in the Wilderness. Hiking and horseback riding opportunities abound within the Wilderness, with destinations frequently, including the Sutor and Hanna Peaks, the North McCullough escarpment, and the Sloan Canyon Petroglyph Site. Although opportunities for camping are possible, this form of recreation is not frequently pursued.

The majority of recreationists use the Wilderness when they visit the Sloan Canyon Petroglyph Site, which is usually accessed from the north by way of the Sloan Canyon wash. Visitation to the Sloan

Canyon Petroglyph Site increased following the designation of the NCA and Wilderness, with large parties, including organized hiking groups, frequenting the site. Based on limited monitoring in 2003–2004, preliminary visitor estimates indicate approximately 5 to 10 persons accessing the Sloan Canyon Petroglyph Site per weekday, and 15 to 20 persons on weekend days.

3.4.4 Disturbance, Development, and Wilderness Impacts

A disturbance inventory for the North McCullough Wilderness was completed in January 2003. Findings from the inventory indicate relatively little disturbance that requires rehabilitation, but several vehicle tracks and several small spurs may require restoration. Developments include the rock and motor dam and dug well (BLM 2003d). Approximately 3.75 miles of two-track vehicle routes and 244 square yards (0.05 acres) of disturbance associated with a rock dam and dug well were identified.

Wilderness disturbances and developments found during this inventory are listed in Table 3.1 and presented in Figure 3.4.

The North McCullough Slickrock Catchment #1 (Project 4916) is the only wildlife water development within the Wilderness and is just south of the Sloan Canyon Petroglyph Site. This wildlife water development was installed before Wilderness designation, when the area was a WSA. The environmental assessment for the development stated that motorized vehicles would not be required for future maintenance.

The Wilderness boundary is inaccessible to vehicles in many places, but in some portions the Wilderness is not well-defined by natural features. All known vehicle access points are currently posted. Although unauthorized use of the Wilderness has not been a significant issue in the past, increased publicity and visitation could require boundary delineation. The boundary is currently marked and signed in only a handful of locations to inform visitors of the change in management when entering the area. Continuing or increased levels of disturbance from unauthorized use of the Wilderness remains a possibility until known access points are signed and barricaded as appropriate.

Table 3.1. North McCullough Wilderness Disturbances and Developments

Disturbance/ Development Number	Description	Length (miles)	Area of Disturbance	Location
1	Two-track vehicle route entering Wilderness from northern boundary	1.47 miles	1.75 acres	East of Sloan Canyon. Approximate route and location shown as 4-Wheel Drive road on United States Geological Survey 1:24,000 maps. T 23 and 24 S; R 61 and 62 E; Sections 36, 1, 6
2	Short two-track vehicle route intersecting Disturbance 1 near northern boundary	.07 miles	.08 acres	T 23 S; R 61 E; Section 36
3	Two-track vehicle route entering Wilderness from Hidden Valley	.30 miles	.35 acres	T 24 S; R 61 E; Section 3, SW1/4, SW1/4, SW1/4
4	Short two-track vehicle route intersecting Disturbance 3 near southern boundary	.09 miles	.10 Acres	T 24 S; R 61 E; Section 10, NE1/4, NE1/4
5	Two-track vehicle route accessing North McCullough Slickrock Catchment #1 from the southern boundary and continuing to west	1.3 miles	1.51 Acres	T 24 S; R 61 E; Sections 2 and 11
6	Short two-track vehicle route	.12 Miles	.14 Acres	T24 S; R 61 E; Sections 2 and 11

Disturbance/ Development Number	Description	Length (miles)	Area of Disturbance	Location
	intersecting Disturbance 5			
7	Rock and motor dam	N/A	133 square yards	T 24 S; R 61 E; Section 1, and 6
8	Dug well	N/A	111 square yards	T 24 S; R 62 E; Section 6, SW 1/4
9	Short two-track vehicle route intersecting Disturbance 5 near southern boundary	.24 Miles	.28 Acres	T 24 S; R 61 E; Section 11
North McCullough Slickrock Catchment #1	Wildlife water development including catchment, tanks, and water access for wildlife	N/A	N/A	T 24 S; R 61 E; Section 2

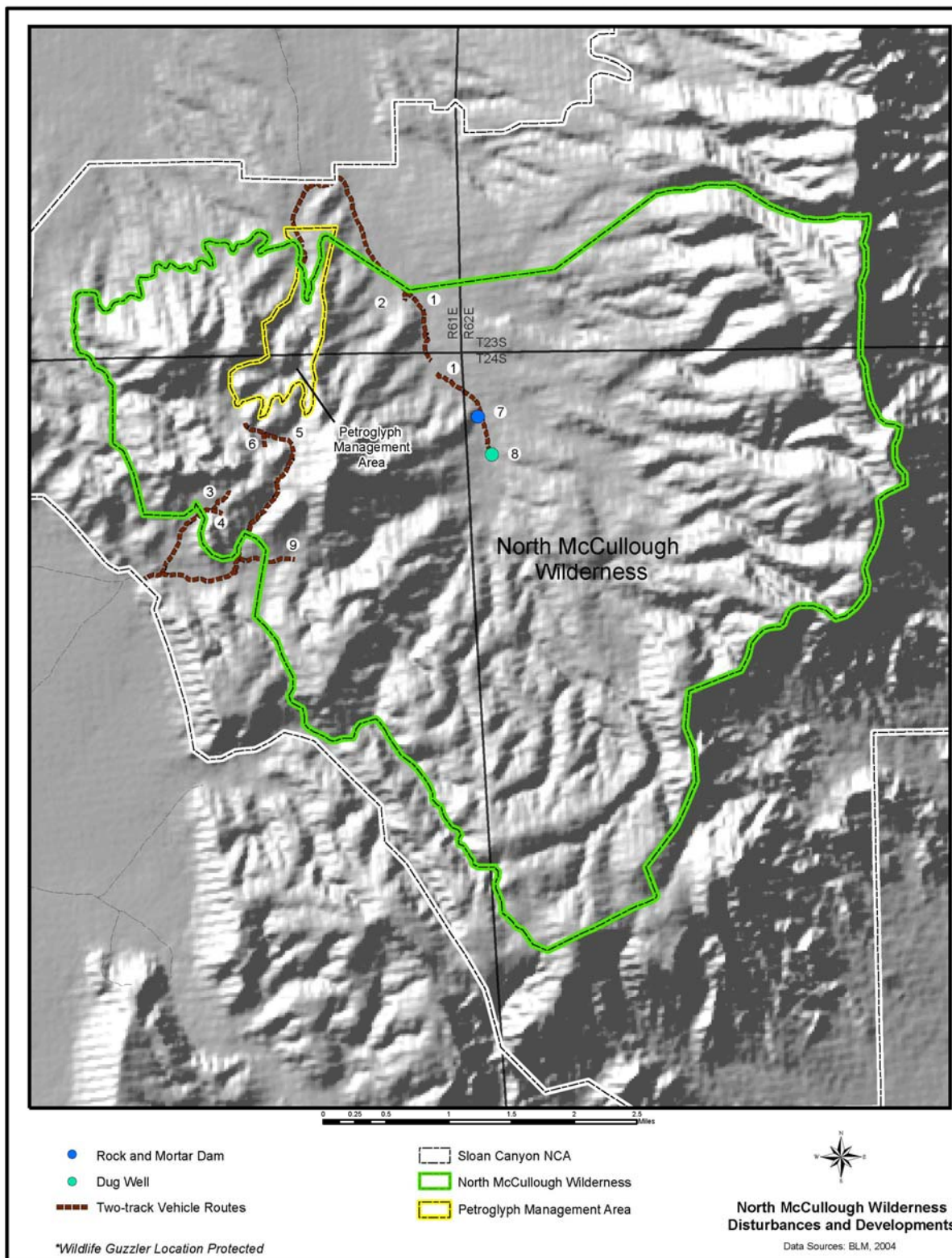
Source: BLM 2003.

3.4.5 Regulatory Framework

On November 6, 2002, the Clark County Act, Title II (“Wilderness Areas”) designated the North McCullough Wilderness from lands formerly identified as the North McCullough. The North McCullough Wilderness is managed according to the Wilderness Act of 1964, the Federal Land Policy and Management Act, the Clark County Act, and BLM Wilderness Regulations published in 43 Code of Federal Regulations (CFR) 6300. BLM implements these laws through its regulations pertaining to Management of Designated Wilderness Areas at 43 CFR 6300.

BLM currently manages the North McCullough Wilderness by providing protection of the area, preserving its wilderness character, and disseminating information about its use that would enhance the public’s present and future use of the Wilderness. BLM is directed to manage all activities conducted in wilderness areas in a manner that preserves their wilderness character.

Figure 3.4. North McCullough Wilderness Disturbances and Developments



3.5 CULTURAL RESOURCES

Evidence of historic and prehistoric use of the Sloan Canyon area has been identified through field inventories (surveys), historical documentation, and oral records. A search of archaeological records identified 32 cultural resource surveys/inventories completed in and around the Sloan Canyon NCA before this planning effort. These surveys identified 54 cultural resource sites in and near the NCA. A systematic, 20 percent sample survey of the NCA was completed as part of this RMP, and 90 additional sites were identified.

3.5.1 Cultural Context

Archaeological evidence suggests that resources within the NCA may have been used for nearly 7,000 years. Limited evidence from cultural resource inventories indicates that Early Archaic cultures used the NCA and the surrounding area for hunting and gathering earlier than 4,000 years ago. The low number of projectile points, combined with the lack of contemporary hunting camps and other hunting features suggest that although the area was used for hunting, use was limited (Duke et al. 2004). An increase in the proportion of Middle Archaic projectile points in relation to earlier points suggests that a patterned use of the NCA's hunting resources occurred between 3,300 and 1,300 years ago (Duke et al. 2004). As with Early Archaic use, the small number of Middle Archaic sites and the lack of related hunting features and habitation sites indicate hunting expeditions into the NCA were not common. Although archaeological evidence suggests the use of the NCA by Native cultures during the Archaic Period, this use was minor when compared to later uses.

The Ceramic Period (1,500 A.D.) marks the beginnings of Puebloan influence in the Las Vegas Valley (Duke et al. 2004). These cultures adopted lifestyles more sedentary than Archaic cultures, often supplementing hunting and gathering with floodplain agriculture. Their ceramics were the most prevalent ware identified within the NCA, indicating a Virgin Branch influence between A.D. 500 and 1200. In addition, artifacts distinctly from the Patayan cultural tradition (Lower Colorado or Yuman) were identified during inventories. Although substantially less common than the Anasazi, the Patayan presence indicates concurrent use of the NCA's resources by more than one culture. By approximately A.D. 1300, the Virgin Anasazi withdrew from the area, roughly 150 to 200 years later than the Pueblo retraction throughout the remainder of the Southwest. At about the same time, Numic, or Shoshonean, cultures made their appearance in the area (Duke et al. 2004.)

When the Europeans arrived, the primary inhabitants of Sloan Canyon were the Las Vegas Band of the Southern Paiute and the closely related Chemehuevi (Duke et al. 2004). Another group, the Mojave, did not share core areas with the Paiute or Chemehuevi, but they did make extensive forays into the deserts and mountains of southern Nevada and sometimes inhabited areas jointly with the other cultures. All these groups employed hunting and gathering methods, supplemented with agricultural cultivation in varying degrees of dependency to supply their resource needs (Duke et al. 2003, BLM 1998a, Myhrer 1991). Vegetation resources were generally a larger part of the diet than was game, which is supported by evidence from the archaeological record. Hunting and gathering relied on exploitation of resources from the surrounding valleys and ranges. The patterns of vegetation and wildlife that are characteristic of southern Nevada played a role in the type of uses and, subsequently, the types and distribution of prehistoric cultural resource sites present in the Sloan Canyon NCA.

The valleys surrounding the McCullough Range were initially utilized by Europeans approximately 150 years ago for transportation routes. These routes were employed in the exploration, settlement, and growth of the area. Springs in Las Vegas were an anticipated resting place by those traveling the Old Spanish/Mormon Trail (Duke et al. 2003). The earliest settlements occurred as a result of the proximity

to the transportation routes. They were later joined by settlements to take advantage of the ranching and mining resources available in and around the Sloan Canyon NCA. Construction of the San Pedro, Los Angeles, and Salt Lake City Railroad in 1905 stimulated the area's mining pursuits, resulting in the establishment of several mining districts, including the Alunite Mining District and the Quo Vadis Mining Company within the present NCA. During this period numerous claims were filed within the present Sloan Canyon NCA. The next major stimulus historically was the construction of Hoover Dam. Job seekers hoping to work on the dam lived in squatters' camps throughout the area.

Although technologies surrounding land uses have changed from prehistoric time, the environmental characteristics of the area have shaped its historic use and, subsequently, the types of historic cultural resource sites present in the Sloan Canyon NCA. Archival research gave little reason to anticipate that historic-period sites would be common, and inventory findings support this assessment.

3.5.2 Cultural Resource Inventories

The entire NCA contains cultural resource sites, although certain areas have higher site density. The Class I cultural resources inventory (a literature review) identified 54 known archaeological sites in and around the Sloan Canyon NCA. Eighty-five percent are prehistoric sites, 15 percent are historic sites. Patterns from the Class I inventory completed in November 2003 led to an expectation of low site densities throughout the NCA, outside of Sloan Canyon itself (Duke et al. 2003). This expectation was confirmed by results from a Class II cultural resources inventory. The Class II inventory consisted of a 20 percent sample field survey that identified 90 sites, nearly 80 percent of which are prehistoric sites.

Through the Class I and II cultural resource inventories, prehistoric sites have been assigned one of five site types and an associated activity assemblage. Each site type is characterized by the presence of certain artifacts in conjunction with site function and location. More complex site types may have several different types of artifacts present together. The following site types were used as the basis for interpreting prehistoric activity assemblages in the NCA:

- Simple Flaked Stone Assemblage
- Quarry Site/Segregated Reduction Sites
- Simple Milling Equipment/Pottery Assemblage Sites
- Distinctive Feature/Artifact Sites
- Complex Feature/Artifact Assemblage Sites.

About 20 percent of the sites identified in the Class II inventory contain a small number of millingstones (usually one or two) located in conjunction with temporary habitations. Another 10 percent have just a few rock art panels or a few simple rock features, such as cairns or rectangular rock alignments. The remaining sites have more elaborate assemblages, suggesting longer use and more varied activities. In comparison to the archaeological record found in most of the Mojave Desert, flaked stone scatters in the NCA are scarce, as are projectile points from past hunting activities.

The Sloan Canyon Petroglyph Site, located within the North McCullough Wilderness, contains more than 300 panels of rock art with more than 1,700 elements recorded along a .5-mile stretch of canyon. The rock art in the canyon includes both petroglyphs and pictographs. Although cultural affiliation has not been determined for each panel, archaeologists studying Sloan Canyon believe it has been used by all the

Native American cultures mentioned earlier, and the canyon is culturally significant to the Native Americans of the area today. As a whole, the archaeological artifacts found in Sloan Canyon are in good condition, although impacts have occurred as a result of erosion, recreational use, and vandalism. In addition to Sloan Canyon, cultural resource inventories have found rock art at 19 other sites in and around the NCA but never in the quantities of, or as elaborate as, those in Sloan Canyon itself.

Compared to prehistoric activity within the NCA, historic use of the McCullough Range has been low (Duke et al. 2003). Activities that occurred within the NCA include mining (related to both an established mining district as well as Depression-era subsistence mining) and uses related to construction of Hoover Dam, prospecting, and livestock grazing sites. There are 15 historic sites identified, with mine complexes being the most common. Although the density of historic period resources is expected to be low within the NCA, property types likely to be encountered include the following:

- Adits (horizontal mine tunnels)
- Shafts
- Prospects
- Industrial (mining-related) debris scatters
- Roadside debris scatters
- Small waste dumps
- Light-duty roads that exhibit few signs of having been “constructed”
- Isolated cabin sites
- Temporary tent camps
- Settlement-related debris scatters.

Of the historic sites identified to date, only two have been identified as potentially eligible for inclusion on the National Register of Historic Places (NRHP).

3.5.3 Sensitivity Model

Analysis of the Class II inventory results provided the groundwork for development of a site sensitivity model for use in this planning effort. Various environmental and geographical criteria were applied, and following testing, the model identified acres of NCA in sensitivity classes, as noted in Table 3.2.

It should be noted that the model, although a useful tool in estimation and analysis, is not meant to replace inventories completed by permitted archaeologists. Because the number of sites identified in the NCA is small, the model was developed and tested from a sample of sites that may not produce statistically significant results. This is a result of the extremely low density of sites in the NCA. The model may be used in analysis and in prioritizing areas for management and/or future inventory. Because of the sensitive and protected nature of cultural resource sites, information related to cultural resource site location or sensitivity level will not be identified further in this document. This information, however, was used in the impact analysis.

Table 3.2. Archaeological Prehistoric Sensitivity Classes

Sensitivity Classes	Acres in NCA	% of NCA
Low	17,477	36.1
Medium	23,082	47.6
High	7,891	16.3

Source: Duke et al. 2004.

3.5.4 Cultural Affiliation

As part of the RMP process, consultation was initiated with 15 Native American tribes and bands that claim ancestral ties to, or traditional cultural use of, the lands in the NCA (section 5.6). An intensive ethnographic study was undertaken with the cooperation of tribal officials and individual members to identify and evaluate the cultural resources of the NCA. Tribal representatives identified the Sloan Canyon Petroglyph Site as the only culturally significant area in the NCA, and these representatives have expressed concerns over the site's preservation and protection from damage and disturbance (Bengston and Kelly 2004).

3.6 SPECIAL DESIGNATIONS—AREAS OF CRITICAL ENVIRONMENTAL CONCERN

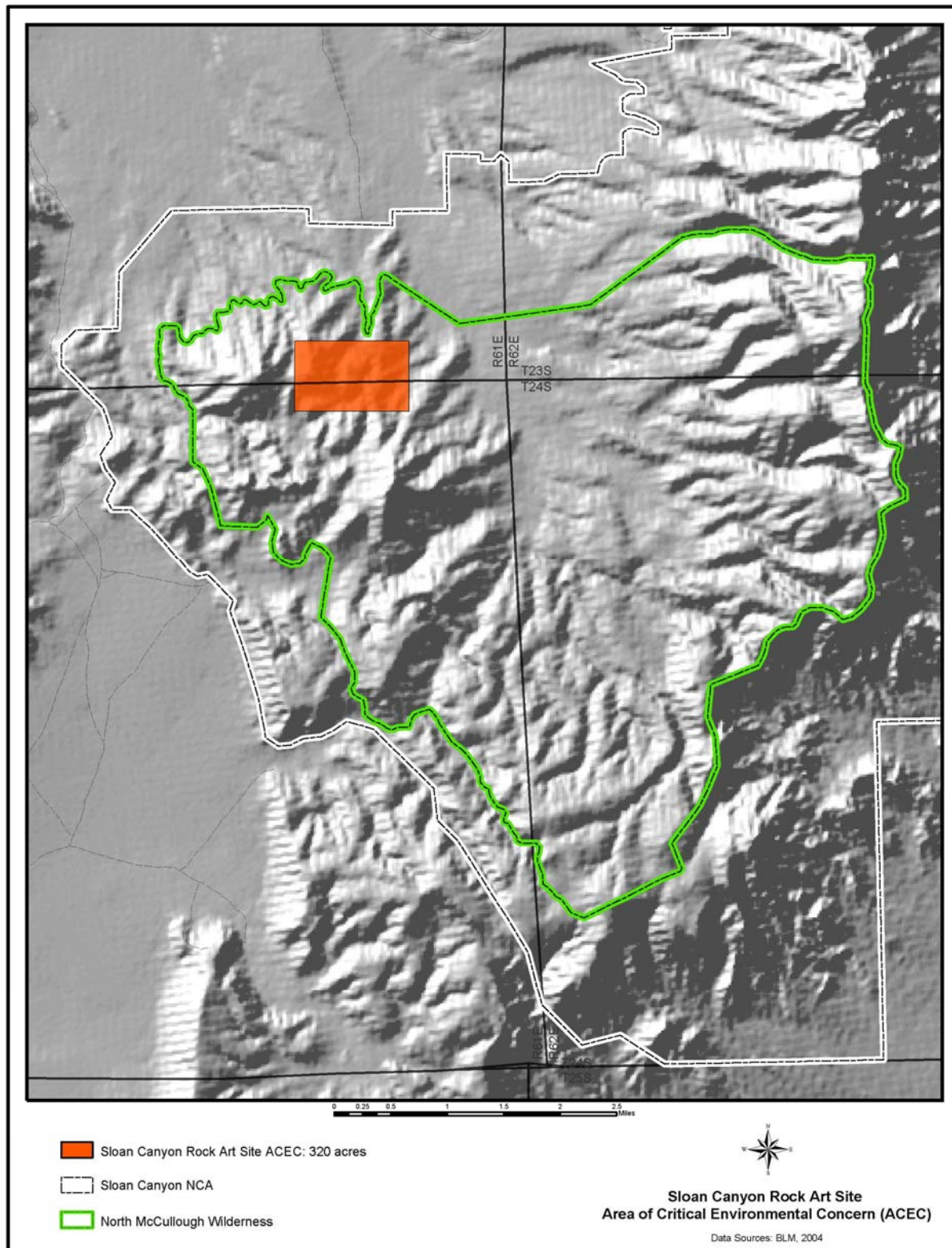
The 320-acre Sloan Canyon Rock Art District Area of Critical Environmental Concern (ACEC) was established by the *Las Vegas RMP* (BLM 1998a) to protect the significant prehistoric habitation and rock art values of the petroglyph area (Figure 3.5). The *Las Vegas RMP* provided further management direction by making this ACEC a right-of-way (ROW) exclusion area, closing the area to locatable minerals, salables, and solid leases, and requiring reclamation of temporary roads.

3.7 VISUAL RESOURCES

The Sloan Canyon NCA is situated in a rugged, desert mountain range rising from the Las Vegas, Eldorado, and Hidden Valleys. Scenic resources were identified in the Sloan Canyon NCA Act as one of the purposes of the NCA, and the importance of this landscape is directly tied to its proximity to Las Vegas, one of the largest metropolitan areas in the Mountain West. The natural character of the NCA directly contrasts with the highly modified human environments to the north, and the scenic quality is an important component of the setting for residents in the City of Henderson and the southern Las Vegas Valley.

The pristine quality of the visual resources in many portions of the NCA is reflective of its rugged and undeveloped nature, however some areas of disturbance and development can be found. The northern portions of the NCA are highly visible from the adjoining City of Henderson and the entire Las Vegas Valley. This area is largely undisturbed, with several minor roads and ROWs slightly modifying the landscape. Along the southern and eastern edges of the NCA, the landscape preserves scenic areas highly visible from U.S. Highway 95, with only some visible landscape modifications. The western and northern edges of the NCA are partly visible from the Interstate 15 corridor and South Las Vegas Boulevard. A moderate level of landscape modification is visible in this area because of the presence of vehicle routes.

Figure 3.5. Sloan Canyon Rock Art Site ACEC



The southern portion of the NCA is essentially unmodified, with a handful of power lines outside the NCA on the east side providing the only significant landscape modification. Table 3.3 lists types of landscape modifications and describes existing modifications within the NCA.

Table 3.3. Existing Landscape Modifications

Type of Landscape Modification	Description of Existing Modifications
Roads and trails	Numerous existing routes visible as landscape modifications Roads concentrated in the northeastern portion of the NCA; other minor routes in and adjacent to other portions of the area
Communication sites	Three ROWs for communication sites situated in the northern portion of the NCA, along the ridgeline of the McCullough Range Landscape modification noticeable because of high visibility of sites
Power lines	Numerous power lines in and adjacent to the NCA Power lines concentrated in northern and eastern areas of the NCA Significant landscape modification in some areas
Wildlife waters	Two constructed wildlife waters located in the NCA, one of these within the North McCullough Wilderness Landscape modification minimal because of construction techniques and camouflaging
Mine sites	Numerous mining claims once existed throughout the NCA; most of these have now been abandoned Landscape modification due to mining efforts varies from minimal to noticeable
Litter	Temporary landscape modification attributed to litter in the northeastern portion of the NCA is significant (although litter would not typically be considered a landscape modification, the presence of extensive amounts of litter in portions of the NCA constitutes a longer term landscape modification than typical litter issues)

Source: BLM 2004d.

3.7.1 Current Management

BLM manages the scenic qualities of the NCA using Visual Resource Management (VRM). Visual resources in the NCA are currently managed according to the direction and classes prescribed through the *Las Vegas RMP* (BLM 1988a) and as indirectly modified by the Clark County Act, Title II (“Wilderness Areas”), which changed the VRM classification of the Wilderness. The VRM objective from the *Las Vegas RMP* (BLM 1988a) is general and limits future impacts on the visual and esthetic character of the public lands. The current VRM classes within the planning area and associated objectives specific to each class are listed in Table 3.4. Please note that the *Las Vegas RMP* only established specific objectives for VRM Classes II, III, and IV, and that the specific objective for Class I is interim until the Record of Decision (ROD) associated with this RMP has been issued.

Table 3.4. Visual Resource Management Classes and Objectives

VRM Class	Management Objective
VRM I	Preserve the existing character of the landscape. Authorized actions may not modify existing landscapes or attract the attention of casual viewers.
VRM II*	Retain the landscape’s existing character. Authorized actions may not modify existing landscapes or attract the attention of casual viewers.
VRM III*	Partially retain the existing character of the landscape. Authorized actions may alter the existing landscape, but not to the extent that they attract or focus attention of the casual viewer.
VRM IV*	Provide for activities involving major modifications of the landscape’s existing character. Authorized actions may create significant landscape alterations and would be obvious to casual viewers.

*Source: BLM1998a.

3.7.2 Visual Resource Inventory

A Visual Resource Inventory (VRI) of the NCA was conducted during the winter of 2003, and the resulting inventory classes are shown in Figure 3.6 (BLM 2004d). The map also shows the Scenic Quality Rating Units (1–15) on which the VRI classes were based. A Scenic Quality Rating Unit is a portion of the landscape that displays primarily homogeneous visual characteristics of the basic landscape features, such as land and water forms, vegetation, and structures (BLM 2004d). Findings of the inventory indicate that large portions of the NCA contain little change to the existing landscape and would be conducive to management designed to retain that character. Some portions of the NCA contain moderate or extensive landscape modifications that detract from scenic quality. Such conditions make it challenging to conserve scenic resources. In these areas, opportunities may exist for restoration and mitigation of disturbances. Other areas of the NCA are so seldom seen that their visual resources do not appear to require intensive management. Nevertheless they may be easily managed to retain existing landscape character and conserve scenic resources despite VRI ratings of Class III or IV.

The inventory confirmed that the NCA contains large areas of undisturbed desert landscape that can continue to be conserved for scenic quality. Many of the areas inventoried provide scenic backdrops for the urban interface, whereas other portions of the NCA contain remote wilderness landscapes. A small portion of the NCA has lower visual appeal but remains suitable for a wider variety of multiple uses and provides ample opportunity for restoration of disturbance. The Sloan Canyon NCA contains a wide variety of high-quality visual resources that can be managed to maintain and improve on existing conditions.

3.8 INTERPRETATION

To date, no interpretive materials or plans specific to the Sloan Canyon NCA have been developed. A comprehensive interpretive program, based in part on information in this PRMP and Appendix F, Sloan Canyon National Conservation Area Interpretive Strategy and Environmental Educational Strategy, would be developed subsequent to completion of the RMP.

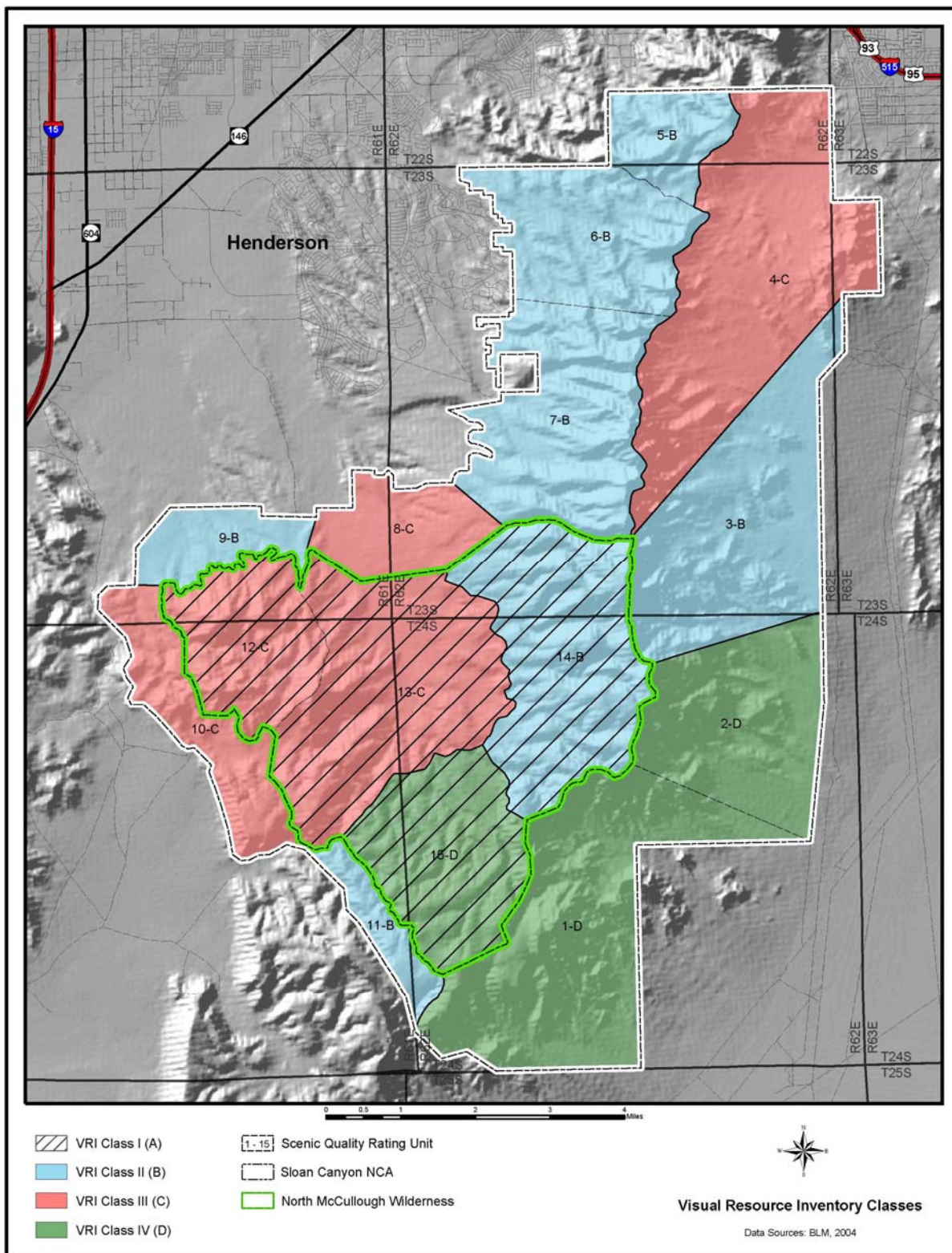
3.9 FACILITIES

Although the Sloan Canyon NCA offers various recreational opportunities, there are currently no BLM-provided facilities. Consequently, recreational users have created small, scattered pullouts and parking areas adjacent to frequently visited locations.

3.10 LANDS AND REALTY

The Sloan Canyon NCA Act withdraws the NCA from all forms of entry and appropriation under the public lands laws while protecting valid existing rights, such as power line ROWs. The issuance of ROWs, permits, and leases may continue under the Act provided they further the purposes of the NCA and are subject to restrictions from other laws, such as the Wilderness Act of 1964 or existing BLM management actions. All lands within the Sloan Canyon NCA boundary are managed by BLM, and there are no private land inholdings.

Figure 3.6. Visual Resource Inventory Classes



3.10.1 Existing Rights-of-Way

According to the *Rights-of-Way Report* (BLM 2004c), 44 valid existing ROWs were on file when the NCA was designated. There are also several pending applications that were filed before the designation, and they would be processed to completion. The ROWs are primarily for power lines, flood control facilities, access roads, and communication sites, and are confined primarily to the northern and eastern portions of the NCA (Figure 3.7).

The Nevada Power Company holds the majority of the ROWs, which are for power lines and supporting infrastructure. The City of Henderson is the second-largest holder of ROWs, which are mainly for flood control and road access. Telecommunication companies and federal, State, local, and private agencies hold the remaining ROWs. Rental fees associated with these ROWs generate more than \$536,000 annually (BLM 2004c). The ROWs are discussed below by category.

3.10.1.1 Power Lines and Access Roads

All power line ROWs are held by the Nevada Power Company for service to the surrounding area and to the communication sites. The ROWs are used for aboveground and underground facilities and to accommodate supporting infrastructure. A majority of these ROWs are issued for perpetuity, except for three power lines to the communication sites. Modification to these ROWs requires an approved ROW amendment.

3.10.1.2 Flood Control Facilities

The City of Henderson holds all the ROWs for flood control, including two detention and two debris basins. Several flood control facilities are outside the NCA, adjacent to its boundaries. Clark County Regional Flood Control holds a ROW for a rain gauge within the NCA.

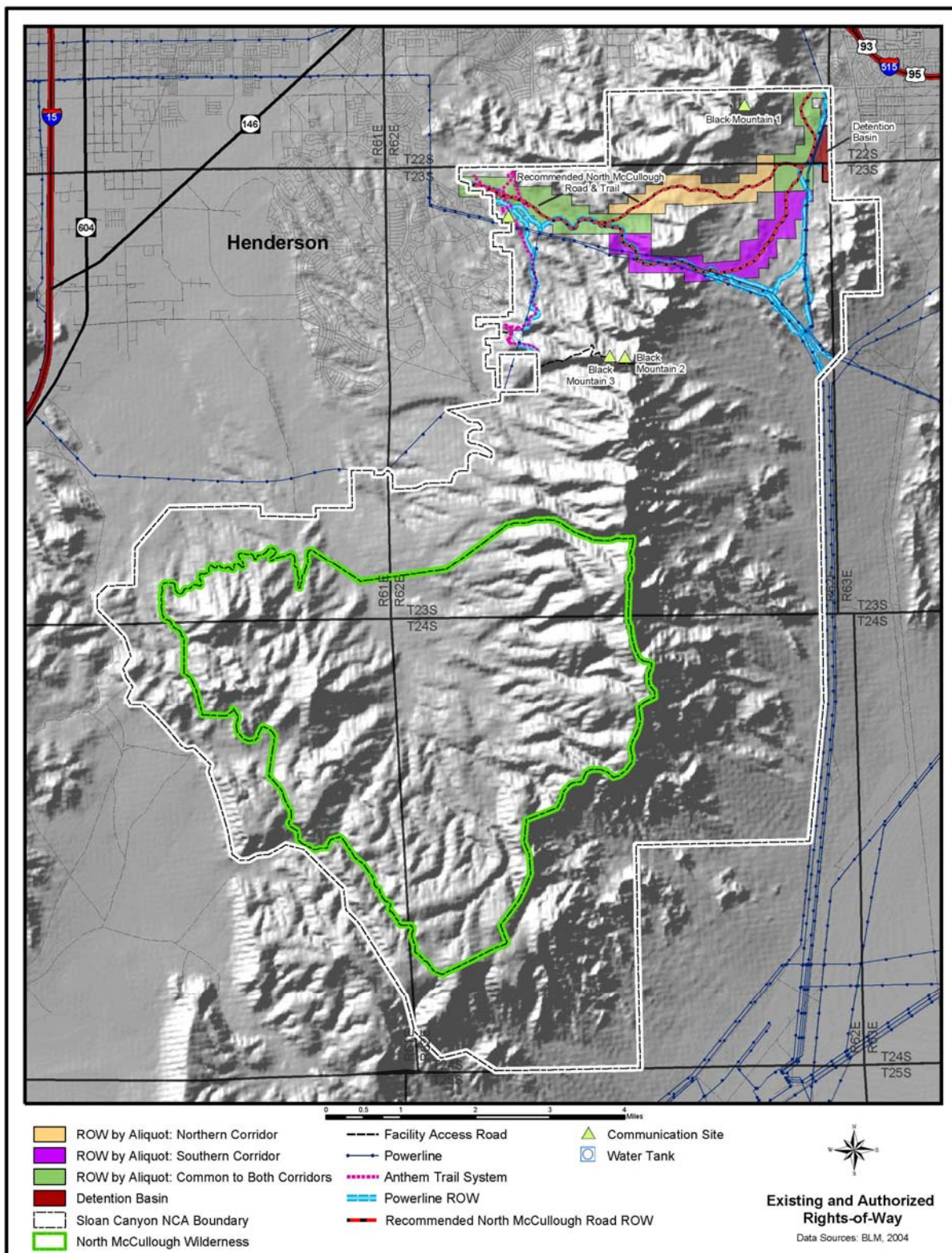
3.10.1.3 Communication Facilities

Three communication sites are located within the NCA: Black Mountain Upper (BM-1), Black Mountain 2 (BM-2), and Black Mountain 3 (BM-3). Each communication site contains multiple ROWs and/or leases for individual communication facilities. The holder/lessee can sublease to other parties the use of a facility for communication purposes without prior written consent of the authorized officer, if so provided by terms and conditions of the grant (43 CFR 2801.1-1[2][f]). The Facility Manager remains the responsible ROW holder, in accordance with the Black Mountain Site Communication Plan.

3.10.2 City of Henderson Rights-of-Way

The City of Henderson holds ROWs for two roads and two trails. The ROW for the existing road is for access to a flood control facility, and two new trail ROWs were granted as part of the Sloan Canyon NCA Act. The Sloan Canyon NCA Act directed BLM to grant the City of Henderson a ROW for the Anthem Trail (N-76312) and the North McCullough Road and Trail (BLM Case File No. N-65874). In September 2002, the City of Henderson submitted an application to construct a trail and scenic roadway through the area now designated as the Sloan Canyon NCA (ROW N-65874). The Sloan Canyon NCA Act required BLM to grant the ROW to the City of Henderson within 180 days of NCA designation and to make a recommendation for the road, unofficially named the North McCullough Road, in the NCA management plan. In May 2003, BLM partially issued the ROW, recognizing that the recommendation for the road location would be developed as part of this RMP process.

Figure 3.7. Existing and Authorized Rights-of-Way

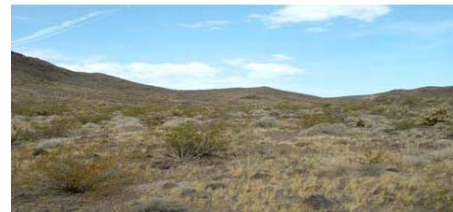


Once the recommendation is finalized through the ROD, the City of Henderson would identify a specific alignment and amend ROW application N-65874 to include road design details and visitor facilities, such as parking areas. Additional environmental reviews would be required for this detailed planning.

ROW application N-65874 contains two proposed corridors for the location of the North McCullough Road and Trail: the Northern Corridor and the Southern Corridor (Figure 3.7). For analysis purposes, potential roadway alignments within each corridor have been proposed based on numerous field visits and topography evaluation.

3.10.2.1 Northern Corridor

The Northern Corridor enters the NCA from the east along Foothills Drive and then turns south for approximately 1 mile. The corridor then turns west and follows a major wash for roughly 1.5 miles until it crests the first saddle. After the first saddle, the alignment drops into a widened valley to crest another two hills.



Saddle along North Corridor

The alignment within the corridor was chosen to reduce the cut and fill required to maintain a reasonable grade along the roadway. After the third crest, the corridor follows an existing roadway for approximately .5 miles and then runs along a ridge with existing transmission poles for another 1.5 miles into the Anthem Community, adjacent to the Del E. Webb Middle School.

3.10.2.2 Southern Corridor

The Southern Corridor enters the NCA in the same location as the Northern Corridor, and both follow the same north-south alignment for approximately 1.5 miles until the two corridors split. The Southern Corridor continues through a highly braided flood plain for nearly 2 miles, until it aligns with an existing power line road. The road then follows the power line road for 1 mile up a steep grade of nearly 12 percent. It then crests the saddle to continue down a steep grade within a major wash for 2 miles and merges with the Northern Corridor. From this point, it too runs on the existing power line road for about .5 miles, then runs along a ridge with transmission poles for another 1.5 miles into Anthem Community, adjacent to the Del E. Webb Middle School.



Power line along southern corridor

3.10.2.3 Conceptual Design

For analysis purposes, conceptual designs have been prepared, to equal levels, for both alignments. The design efforts included generating horizontal and vertical alignments, developing typical cross-sections, establishing cut/fill limits and quantities, calculating potential disturbed area, and identifying major drainage crossings.

Unauthorized Uses

Several unauthorized uses were identified as part of the *Rights-of-Way Report* (BLM 2004c). A telecommunications facility is located in an area where a ROW has expired, and the original lessee has

since vacated the area. The Nevada Power Company has an unauthorized use within an existing ROW (N-59499) and is in the process of filing an amendment to resolve the trespass. Because the public land boundary for the NCA is not clearly marked, unauthorized uses such as illegal motorized vehicle travel and dumping could occur in the future.

3.10.3 Filming and Photography

Historically no commercial movie filming or photography has been authorized within the NCA boundary.

3.11 TRANSPORTATION (REGISTERED MOTORIZED VEHICLES)

The NCA is located in the rapidly growing metropolitan area of Clark County, Nevada, a region supported by an urban transportation network that serves the Las Vegas Valley. The NCA is flanked by Interstate 15 to the west, Interstates 215 and 515/Highways 93 and 95 to the north, and U.S. Highway 95 to the east. Figure 3.8, Transportation System Map, shows the NCA in the context of the regional transportation network. New development is occurring along the northern and western NCA border in the City of Henderson, and it is likely that local traffic patterns could change in the future. Figure 3.9, Roads and Routes Proposed for Construction and Registered Motorized Vehicle Designation Map, shows the current roads within the NCA, all of which are dirt and unmaintained except for those maintained by ROW holders. At this time, BLM has not designated any roads within the NCA as open to the public.

3.12 VEGETATION MANAGEMENT

Vegetation within the Sloan Canyon NCA is diverse and representative of the Mojave Desert ecosystem, which covers the southern portion of Nevada, southwestern Utah, southeastern California, and extends into northwestern Arizona. The Mojave Desert is the smallest of the four North American deserts and is considered intermediate both geographically and floristically of the Great Basin Desert to the north and the Sonoran Desert to the south (MacMahon 1997).

The vegetation associations within the Sloan Canyon NCA are the result of the interaction between soils, geology (bedrock and surficial), climate, geomorphology, landforms, and morphometry (elevation, aspect, and slope). Typical to the region, the area is dominated by sparse desert vegetation associated with bajadas, inset fans, and rocky outcrops. There are no permanent streams within the NCA; however many of the dry washes show evidence of past surface water and debris flow.

The Mojave Desert scrub community in the Sloan Canyon NCA is primarily composed of low, widely spaced shrubs, including the creosote bush (*Larrea tridentata*) and the white bursage (*Ambrosia dumosa*). Other affiliated community shrubs include ephedra (*Ephedra* spp.); brittlebrush (*Encelia virginensis*); burro bush (*Hymenoclea salsola*); sweetbush, or bebbia (*Bebbia juncea*); and desert saltbush (*Atriplex polycarpa*). Characteristic species associated with the Mojave Desert include Mojave yucca (*Yucca schidigera*), teddybear cholla (*Opuntia bigelovii*), and hedgehog cacti (*Echinocereus* spp.). Short-lived annual and perennial wildflowers appear at the lower elevations in late March, April, and May, when prompted by winter rains.

Figure 3.8. Transportation System

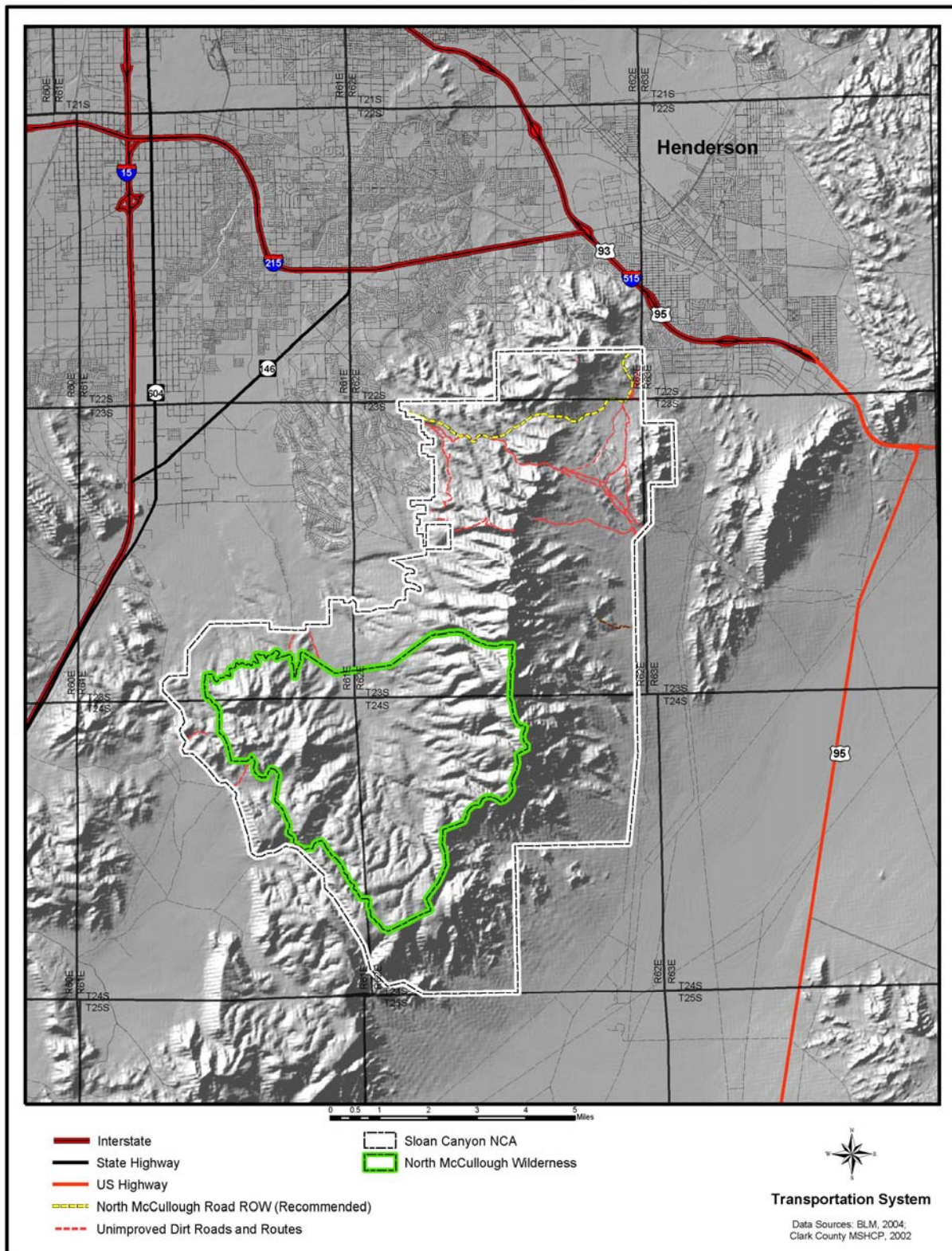
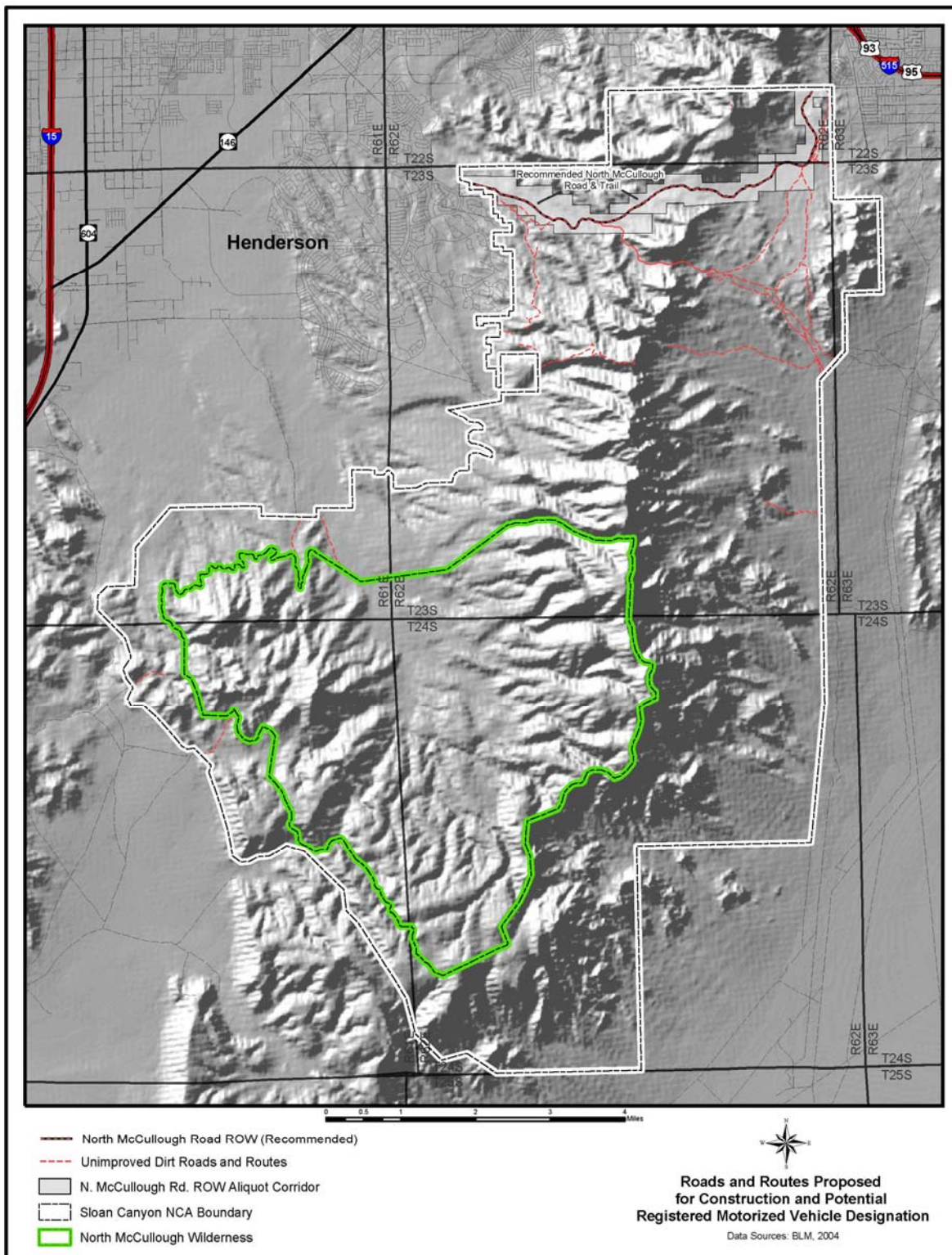


Figure 3.9. Roads and Routes Proposed for Construction and Potential Registered Motorized Vehicle Designation



3.12.1 Vegetation Associations

Four vegetation associations are represented within the Sloan Canyon NCA: (1) volcanic basalt slope associations, (2) moderate creosote (greater than 30 percent cover), (3) sparse creosote/bursage mix, and (4) desert wash associations (BLM 2004e). Vegetation association descriptions are listed below. The distribution of vegetation associations within the NCA is presented in Figure 3.10.

3.12.1.1 Volcanic Basalt Slope Association

The volcanic basalt slope association is found on the steeper north-facing slopes of the NCA. This association contains basalt rock outcrops, and the plant species composition is highly variable. Creosote is present in most of this vegetation association; however, north-facing slopes may lack creosote canopy cover. Shrub species present include creosote (*Larrea tridentata*), ephedra (*Ephedra spp.*), prickly pear (*Opuntia spp.*), and perennial and annual grasses and forbs.



3.12.1.2 Moderate Creosote

The moderate creosote association is dominated by creosote (greater than 30 percent canopy cover) and also contains bursage (*Ambrosia dumosa*), ephedra (*Ephedra spp.*), and in some areas a significant amount of Cholla cactus (*Opuntia spp.*). The moderate creosote association has a limited distribution within the NCA and may be associated with increased soil moisture availability. Saltbush (*Atriplex spp.*) and perennial and annual grasses and forbs are also associated with the moderate creosote association.

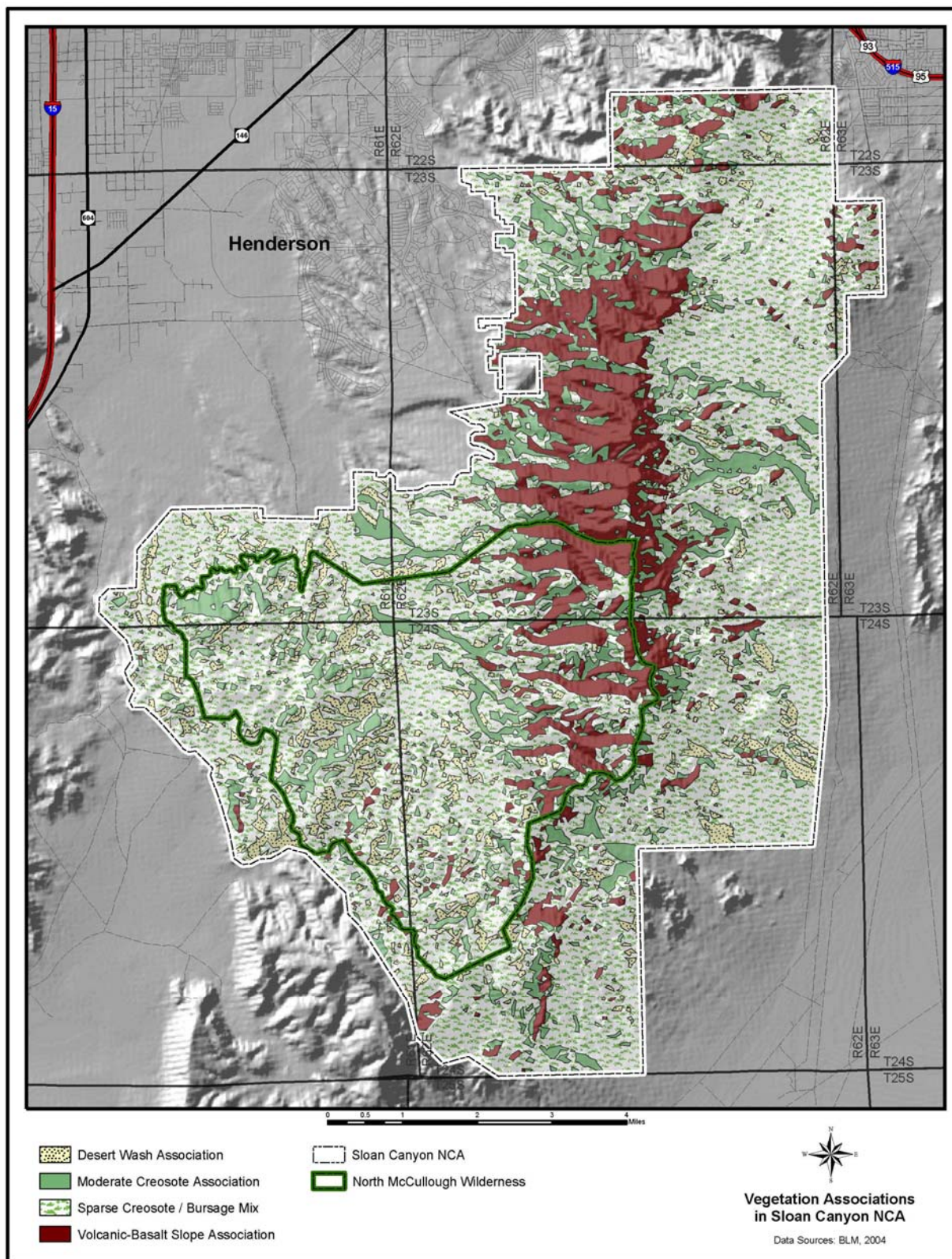


3.12.1.3 Sparse Creosote/Bursage Mix

The sparse creosote association is the most abundant association within the Sloan Canyon NCA. The sparse creosote vegetation association is an open sparse plant association dominated by creosote bush (*Larrea tridentata*). Ephedra (*Ephedra*), bursage (*Ambrosia dumosa*), and saltbush (*Atriplex spp.*) are also common shrub species in the sparse creosote association. The canopy cover of vegetation in this association is typically less than 30 percent, and desert pavement dominates some areas. Annual and perennial grasses and forbs are also present.



Figure 3.10. Vegetation Associations in Sloan Canyon NCA



3.12.1.4 Desert Wash Associations

Desert washes within the Sloan Canyon NCA are ephemeral watercourses that are dry most of the year. The increased quantity of available water, even for brief periods, in desert washes supports vegetation that differs from that of adjoining plant associations in species composition, structure, and soil moisture availability.

Most occurrences are at elevations lower than 5,000 feet within sandy arroyos, washes, and subirrigated bajadas. Dominant species include cat claw (*Acacia greggii*), desert willow (*Chilopsis linearis* ssp. *arcuata*), Mormon tea (*Ephedra* spp.), and indigo bush (*Psoralea fremontii*).



3.12.2 Special Status Species

Special Status Species are those species that are either Listed, Candidates for Listing, or identified by BLM as being important for consideration in management actions. Within the Sloan Canyon NCA, the rosy two-tone beardtongue (*Penstemon bicolor* ssp. *roseus*), white-margined beardtongue (*Penstemon albomarginatus*), and Blue Diamond cholla (*Opuntia whipplei* var. *multigeniculata*) have habitats that have been identified within or adjacent to Sloan Canyon NCA (Bostick 1973, Marrs-Smith personal communication 2004 [Table 3.5]).

Figure 3.11 illustrates the results of a GIS model developed as part of this planning process to determine potential areas within the Sloan Canyon NCA where these species could occur. The potential habitat areas are more likely to contain possible populations of these species, however on the basis of the broad criteria used to develop these models, other areas of the NCA also have the potential for populations of these species.

Table 3.5. Flora Potentially Occurring in Sloan Canyon NCA

Common Name	Scientific Name	Characteristics	NV BLM Sensitive	USFWS/ESA Candidate	NNHP Sensitive MSHCP Watch	MSCHP-Covered	State-Listed Critically Endangered
Blue Diamond cholla	<i>Opuntia whipplei</i> var. <i>multigeniculata</i>	Occurs mostly on north-facing slopes and exposed ridges.	•	•		•	•
Rosy Two-tone beardtongue	<i>Penstemon bicolor</i> ssp. <i>roseus</i>	Occurs on rocky calcareous, granitic, or volcanic soils in washes, roadsides, scree at outcrop bases, rock crevices, or similar places receiving enhanced runoff in the creosote-bursage, blackbrush, and mixed-shrub zones.	•	•	•		

Common Name	Scientific Name	Characteristics	NV BLM Sensitive	USFWS/ESA Candidate	NNHP Sensitive MSHCP Watch	MSCHP-Covered	State-Listed Critically Endangered
White-Margined beardtongue	<i>Penstemon albomarginatus</i>	Occurs on sand deposits on leeward side of dry lakebeds between 1,500 and 3,600 feet elevation, in the wash bottoms of outwash canyons, and occasionally on slopes above them.	•	•		•	

NV BLM Sensitive—Nevada Bureau of Land Management Plan species that may occur within NCA.

USFWS/ESA Candidate—U.S. Fish and Wildlife Endangered Species Act Candidate Species for Listing.

NNHP Sensitive MSHCP Watch—Nevada Natural Heritage Program Plant Species that may occur within NCA.

MSHCP Covered—(Clark County) Multiple Species Habitat Conservation Plan species within ecosystems of the Sloan Canyon NCA.

State-Listed Critically Endangered—Critically Endangered and Threatened With Extinction-listed by the Nevada State Forester Pursuant to NRS 527.270.

Source: BLM 2004c.

3.12.3 Noxious and Invasive Weeds

The spread of noxious and invasive weed plant species contributes to the loss of habitat productivity, reduced water quality and quantity, reduced structural and species diversity, and loss of wildlife-specific habitat. In some instances, these species are hazardous to human health and welfare, as emphasized in the Federal Noxious Weed Act (Public Law 93-629) and Executive Order 13112 Invasive Species. To minimize the potential of non-native seeds being brought into the area, NDOW has issued guidance to hunters on the use of animal feed (NDOW 2004b).

Most if not all non-native plant infestations begin as small outbreaks in disturbed areas, such as utility corridors, trails, range improvement footprints, roadsides, ROWs, and mining disturbances. Seeds of non-native plants may have been transported to the area in feed for pack animals, recreation use, revegetation, grass mixtures, or blown in from distant sources. As non-native plants find disturbed areas with no natural competition, they quickly spread, overtaking native vegetation and reducing the biological diversity and ecologic viability of the ecosystem. Invasive species such as red brome (*Bromus madritensis*) are widespread throughout the NCA and could alter wildland fire cycles (Simonin 2001).

Although a survey has not been completed, an immediate concern is the potential noxious species invasion of Sahara mustard (*Brassica tournefortii*), which utilizes sandy soils at lower elevations, and tamarisk (*Tamarix spp.*), which could occupy wash bottoms. Figure 3.12 illustrates the results of a GIS model developed as part of this planning process to determine potential areas within the Sloan Canyon NCA where these species could occur.

Figure 3.11. Potential Habitat for Special Status Plant Species

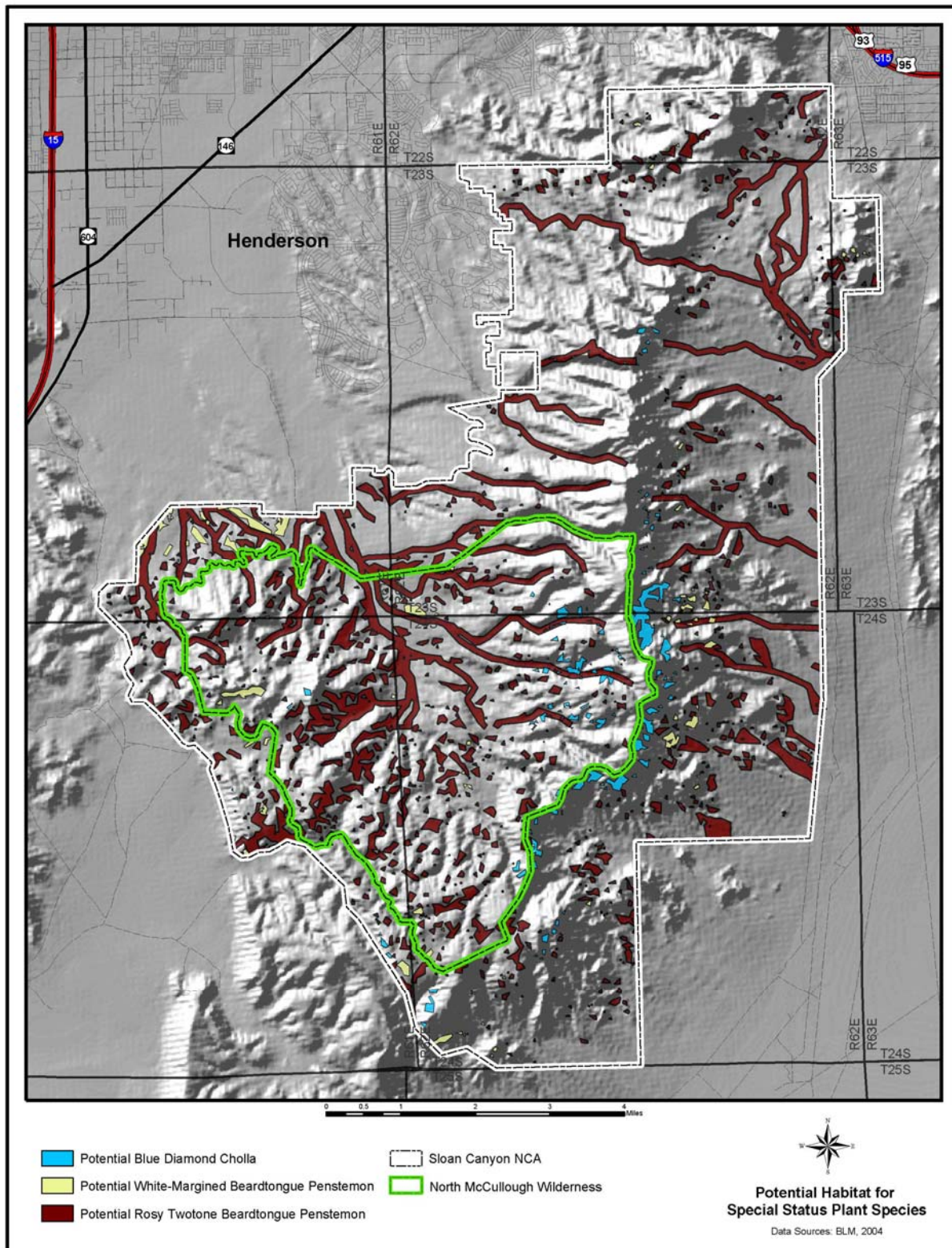
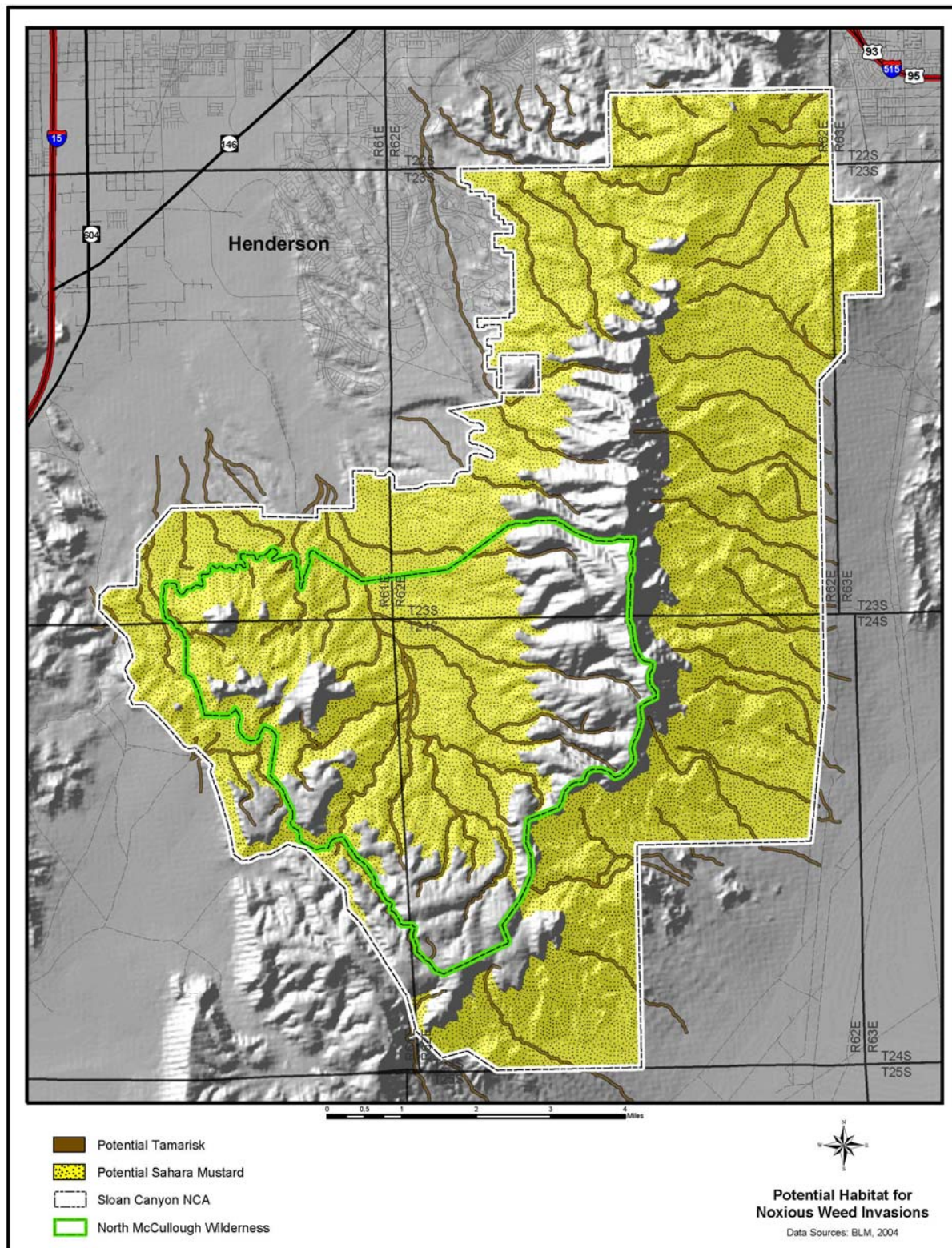


Figure 3.12. Potential Habitat for Noxious Weed Invasions



3.13 WILDLIFE MANAGEMENT

Although only one ecosystem type, Mojave Desert scrub, is represented in the NCA, it supports a variety of wildlife species. To date the actual number of wildlife species occurring within the Sloan Canyon NCA is unknown, however vertebrate wildlife species found within the NCA's borders represent three major classes: reptiles, birds, and mammals. Because there are no natural perennial water sources, no known fish or mollusks species occur. One amphibian species, red spotted toad (*Bufo punctatus*), may be found in temporary pools near the wildlife water development (guzzler) (D.B. Hardenbrook personal communication 2005).

The primary natural factors that influence populations and distribution for wildlife are water availability, vegetation, topography, and weather patterns. Water supplies, both open and below ground, are limited within the NCA, with springs and seeps serving as areas of habitat concentrations. The Sloan Canyon NCA is composed of igneous rocks, which provide small caves that act as habitat or escape cover for a variety of species. In addition to the natural factors in Sloan Canyon, human presence and activities such as recreation use impact wildlife distribution.

3.13.1 Regulatory Framework

The NDOW is responsible for the direct management of wildlife populations within the Sloan Canyon NCA. The BLM Las Vegas Field Office is responsible for managing the habitat but also performs an integral role in sustaining and ensuring the ecological health and viability of wildlife populations. The USFWS provides regulatory oversight for all species that are Listed, Proposed for Listing, or Candidates for Listing as Threatened or Endangered under the ESA, and also administers the Migratory Bird Treaty Act (MBTA), which protects migratory bird species.

The *Las Vegas RMP* (BLM 1998a) and the *Desert Tortoise Recovery Plan* (USFWS 1994) currently provide the BLM Las Vegas Field Office up-to-date direction for habitat and wildlife management.

The Sloan Canyon NCA Act requires BLM to provide access for installing, repairing, maintaining, and reconstructing water developments, including water guzzlers, that would enhance the NCA by promoting healthy, viable, and more widely distributed wildlife populations. Currently the NCA contains two big game guzzlers, with another directly adjacent to the NCA southeastern boundary.

3.13.1.1 Hunting

Annually, NDOW issues limited entry permits for the hunting of bighorn sheep in the North and South McCullough Range, which includes the NCA (NDOW 2003). Bighorn sheep hunting licenses are issued based on population dynamics and recommendations from NDOW and County Wildlife Advisory Boards. NDOW also permits recreational hunting for bobcats and mountain lions, rabbits, dove, quail, and coyote, as well as trapping for coyote, bobcat, gray fox, and kit fox.

3.13.1.2 Reptile Collecting

Of the State's 54 native reptile species, 36 may be commercially collected in the State of Nevada through issuance of a permit from NDOW (Nevada Department of Conservation and Natural Resources [NDCNR] 2004a). There are concerns about the potential impact of this collection on total population numbers, as well as the potential for species integrity to be diminished as large reptiles are harvested; however, a baseline population and distribution data are lacking for most reptile species, making it

difficult to determine long-term effects of commercial collecting and unlimited reptile harvesting on reptile populations (NDCNR 2004a).

3.13.1.3 Migratory Birds

The United States has ratified international conventions concerning the protection of migratory birds, as implemented by the MBTA of 1918 (16 United States Code [U.S.C.] 703-711). The MBTA prohibits “taking,” which is the killing, possession, or transport of any migratory bird or their eggs, parts, or nests, except as authorized by a valid permit. These actions may be permitted only for educational purposes, and harvest is limited to levels that prevent overutilization. Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, was issued in January 2001 and emphasizes that federal actions are subject to the MBTA and directs federal agencies (such as BLM) to evaluate the effects of agency actions in National Environmental Policy Act documents like this Final EIS.

Under the MBTA, permits can be issued by USFWS for the intentional take of specific birds and nests that have been identified before application for the permit; however, no permits can be issued for take that is incidental to the action being taken (i.e., incidental take). All native bird species likely to be found within the NCA are protected under the MBTA, and any incidental take of these protected species would constitute a violation of the MBTA.

3.13.2 Potential Wildlife Species

3.13.2.1 Mammals

Small mammals expected to occur within the NCA include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), desert kangaroo rat (*Dipodomys deserti*), rock squirrel (*Spermophilus variegatus*), and antelope ground squirrel (*Ammospermophilus leucurus*). Bat species such as the big free-tailed bat (*Tadarida macrotis*) and Brazilian free-tailed bat (*Tadarida brasiliensis*) are also known to occur in small caves of the NCA (Nevada Bat Working Group 2002). Larger mammal species include the coyote (*Canis latrans*), grey fox (*Urocyon cinereoargenteus*), kit fox (*Vulpes macrotis*), desert bighorn sheep (*Ovis canadensis nelsoni*), mule deer (*Odocoileus hemionus hemionus*), bobcat (*Lynx rufus*), and mountain lion (*Felis concolor*).

3.13.2.2 Birds

Bird species expected to occur within the NCA include the black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), black-chinned hummingbird (*Archilochus alexandri*), Anna’s hummingbird (*Calypte anna*), broad-tailed hummingbird (*Selasphorus platycercus*), Gambel’s quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californianus*), phainopepla (*Phainopepla nitens*), loggerhead shrike (*Lanius ludovicianus*), red-tailed hawk (*Buteo jamaicensis*), and Swainson’s hawk (*Buteo swainsoni*).

3.13.2.3 Reptiles

Reptiles are the most common and diverse species that occurs within the NCA. Lizards that are expected to occur within the NCA include the desert iguana (*Dipsosaurus dorsalis*), chuckwalla (*Sauromalus obesus*), western banded gecko (*Coleonyx variegatus*), Great Basin collared lizard (*Crotaphytus bicinctores*), side-blotched lizard (*Uta stansburiana*), Gila monster (*Heloderma suspectum*), desert horned lizard (*Phrynosoma platyrhinos*), long-nosed leopard lizard (*Gambelia wislizenii*), and the long-tailed brush lizard (*Urosaurus graciosus*). Snakes expected to occur include the coachwhip (*Masticophis flagellum*), Mojave rattlesnake (*Crotalus scutulatus*), sidewinder (*Crotalus cerastes*), speckled rattlesnake

(*Crotalus mitchelli*), western patch-nosed snake (*Salvadora hexalepis*), long-nosed snake (*Rhinocheilus lecontei*), and the spotted leaf-nosed snake (*Phyllorhynchus decurtatus*). The desert tortoise (*Gopherus agassizii*) is the only tortoise located within the NCA.

3.13.3 Special Status Species

Wildlife Special Status Species include species Federally Listed as Threatened and Endangered, Proposed for Listing, or Candidates for Listing under the ESA. They also include species designated by each BLM State Director as Sensitive and those listed, or proposed for listing, by a State in a category implying potential endangerment or extinction. BLM is mandated to protect and manage Threatened, Endangered, Candidate, Proposed, and BLM Sensitive wildlife species and their habitat. BLM is also required to protect and manage Sensitive species jointly identified with the appropriate State agency. The State of Nevada employs the Nevada Natural Heritage Program's (NNHP) list for an official list of State Sensitive, Threatened, or Endangered wildlife species. Table 3.6, Fauna Special Status Species Potentially Occurring in Sloan Canyon NCA, presents the lists of species that could occur within the NCA that are either federally protected, BLM Sensitive species, part of the NNHP, or included in the *Clark County MSHCP* (CCDCP 2000). The species listed in Table 3.6 are based on county-level information and existing survey data, and the NCA may not contain habitat for all the species listed.

3.13.3.1 Federally Protected Species

The BLM is responsible for the protection of Federally Listed, Proposed for Listing, or Candidates for Listing species in the NCA, which includes the protection of habitat. Presently, the Mojave population of the desert tortoise (*Gopherus agassizii*) is listed as Threatened and is the only federally protected species located in the NCA (USFWS 2003). The USFWS has developed a recovery plan for the species and has identified and designated critical habitat within the BLM Las Vegas Field Office jurisdiction. None of this critical habitat lies within the NCA boundaries (USFWS 1994).

3.13.3.2 BLM Sensitive Species

BLM Sensitive species are not Federally Listed, Proposed, or Candidate species or State of Nevada-listed species; however, the agency's policy is to provide these species with the same level of protection provided for Candidate species. This ensures that actions authorized, funded, or carried out by BLM do not contribute to the need for the species to become Listed. According to BLM policy (BLM manual 6840.06 E), a species may be listed as Sensitive if it—

- Could become endangered or extirpated from a State, or within a significant portion of its range, in the foreseeable future.
- Is under status review by the USFWS.
- Is undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution and/or population or density such that Federally Listed, Proposed, Candidate, or State-listed status may become necessary.
- Typically consists of small and widely dispersed populations.
- Inhabits ecological refugia or specialized or unique habitats.
- Is State-listed but may be better conserved through application of BLM Sensitive species status.

Table 3.6. Fauna Special Status Species Potentially Occurring in Sloan Canyon NCA

Common Name	Scientific Name	Habitat Characteristics	NV BLM Sensitive Wildlife ¹	NNHP ²	MSHCP-Covered Species ³	MSHCP High-Priority Evaluation Species ⁴
Mammals						
Desert pocket mouse	<i>Chaetodipus penicillatus sobrinus</i>	Sandy or soft alluvial soils along stream bottoms, desert washes, and valleys.				•
Desert kangaroo rat	<i>Dipodomys deserti</i>	Sandy to rocky soils in desert locations with little vegetation.				•
Desert valley kangaroo mouse	<i>Microdipodops megacephalus albiventer</i>	Creosote scrub.	•	•		
Desert bighorn sheep	<i>Ovis canadensis nelsoni</i>	Steep rocky mountainous terrain above desert floor and lower elevation areas with moderate slopes and ruggedness; access to surface water.	•	•		
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Shrub-steppe or forest edge in rocky outcrops or caves.	•			•
Pallid bat	<i>Antrozous pallidus</i>	Found in various habitats from desert to brushy terrain to coniferous forest and non-coniferous woodlands; found in all habitats from low desert (creosote bush) to coniferous forest.				
Long-eared myotis	<i>Myotis evotis</i>	Brush, woodland, and forest habitats; prefers coniferous woodlands and forests.			•	
Silver-haired bat	<i>Lasionycteris noctivagans</i>	Hot, semi-arid, shrubby habitats, especially mesquite and brushy pinyon-juniper woodlands; also chaparral, desert scrub. Thorn scrub, oak-juniper woodland, pinyon-juniper, juniper-cholla, mesquite, dry chaparral.			•	
Kit fox	<i>Vulpes macrotus</i>	Dry meadows and grasslands, scrub, foothills, and other arid areas.				•
Birds						
Northern goshawk	<i>Accipiter gentiles</i>	Creosote scrub.	•	•		
Golden eagle	<i>Aquila chrysaetos</i>	Shrubby vegetation near clearings and open areas for foraging; otherwise, a mosaic of altered and unaltered habitat on a landscape scale.	•	•		

¹ **NV BLM Sensitive Wildlife**—Nevada Bureau of Land Management wildlife species that may occur within NCA.

² **NNHP**—Nevada Natural Heritage Program species that may occur within NCA.

³ **MSHCP-Covered Species**—(Clark County) Multiple Species Habitat Conservation Plan -covered species within ecosystems of the Sloan Canyon NCA.

⁴ **MSHCP High-Priority Evaluation Species**—(Clark County) Multiple Species Habitat Conservation Plan high-priority evaluation species within ecosystems of the Sloan Canyon NCA.

Table 3.6. Fauna Special Status Species Potentially Occurring in Sloan Canyon NCA

Common Name	Scientific Name	Habitat Characteristics	NV BLM Sensitive Wildlife ¹	NNHP ²	MSHCP-Covered Species ³	MSHCP High-Priority Evaluation Species ⁴
Prairie falcon	<i>Falco mexicanus</i>	Perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas.	•	•		
Ferruginous hawk	<i>Buteo regalis</i>	Sagebrush scrub, pinyon-juniper, montane scrub, yellow pine-white fir, lodgepole pine-red fir, cliff faces, salt-tolerant desert scrub, rangeland.	•	•		
Swainson's hawk	<i>Buteo swainsoni</i>	Grassland, shrubland, agricultural areas where it has open areas to forage and where roost sites are available.	•	•		
Loggerhead shrike	<i>Lanius ludovicianus</i>	Open grassland or agricultural areas with some shrubs or small trees for perching, hunting, nesting. Prefers habitats with relatively short grasses and forbs.	•	•		
Phainopepla	<i>Phainopepla nitens</i>	Desert, scrubland, riparian, and woodland habitat, areas supporting desert trees bearing mistletoe. These trees typically are mesquite, catclaw acacia, and juniper.		•	•	
Vesper sparrow	<i>Pooecetes gramineus</i>	Breeds in sagebrush and other shrub habitats with sparse vegetation. Occupies grasslands and croplands in winter, often using scattered shrubs and patches of tall herbs for cover.		•		
Gray vireo	<i>Vireo vicinior</i>	Arid, shrub-covered slopes in pinyon-juniper, juniper, and chamise-redshank chaparral habitats on foothills and mesas.		•		
American peregrine falcon	<i>Falco peregrinus anatum</i>	All wetlands, marsh, riparian, sagebrush scrub, springs.			•	
Western burrowing owl	<i>Athene cucularia hypugea</i>	Open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands.				•
Reptiles						
Gila monster	<i>Heloderma suspectum</i>	Mountain foothills dominated by saguaros and palo verde trees, also washes that extend down into valleys.	•	•		
Banded Gila monster	<i>Heloderma suspectum cinctum</i>	Mountain foothills dominated by saguaros and palo verde trees, also washes that extend down into valleys.				•
Short-horned lizard	<i>Phrynosoma douglassii</i>	Variety of dry habitats, including sagebrush, grassland, and open woodlands, and variety of soil types, including rocky soils, but prefer areas with some loose or sandy soil.	•			
Western Chuckwalla	<i>Sauromalus obesus obesus</i>	Rocky, creosote bush, desert.			•	
Desert tortoise	<i>Gopherus agassizii</i>	Typically relatively flat valley bottoms. Other suitable habitat includes salt-tolerant desert scrub, Joshua tree woodland, creosote scrub, sagebrush scrub, pinyon-juniper, montane scrub, and rangeland.		•	•	
Banded gecko	<i>Coleonyx variegatus</i>	Rocky or sandy desert and semiarid locales in oak and pinyon-juniper woodlands.			•	
Great Basin collared lizard	<i>Crotaphytus insularis bicinctores</i>	Occurs mainly in xeric, sparsely vegetated rocky areas; sometimes in adjacent areas lacking much rock; perches atop rocks.			•	
Large-spotted leopard lizard	<i>Gambelia wislizenii wislizenii</i>	Desert and semidesert areas with scattered shrubs or other low plants, especially areas with abundant rodent burrows.			•	

Table 3.6. Fauna Special Status Species Potentially Occurring in Sloan Canyon NCA

Common Name	Scientific Name	Habitat Characteristics	NV BLM Sensitive Wildlife ¹	NNHP ²	MSHCP-Covered Species ³	MSHCP High-Priority Evaluation Species ⁴
Speckled rattlesnake	<i>Crotalus mitchelli</i>	Inhabits rocky hillsides and outcrops and is found near alluvial deposits in the desert.			•	
Mojave green rattlesnake	<i>Crotalus scutulatus scutulatus</i>	Occurs in sparsely vegetated arid lowlands, grass-covered flatlands, and less often along the lower mountain slopes below 4,000 ft. Prefers high, barren desert dotted with creosote bush, mesquite, and cactus.			•	
Desert iguana	<i>Dipsosaurus dorsalis</i>	Creosote bush desert with hummocks of loose sand and patches of firm ground with scattered rocks.			•	
Western leaf-nosed snake	<i>Phyllorhynchus decurtatus</i>	Rocky, gravelly, or sandy creosote bush desert.			•	
Sonoran lyre snake	<i>Trimorphodon biscutatus lambda</i>	Chiefly in rocky areas of lowlands, mesas, and lower mountain slopes; desert grassland, desert scrub, chaparral, pinyon-juniper and oak woodland, open coniferous forest, thornscrub, and “thornforest.”			•	
Glossy snake	<i>Arizona elegans</i>	Barren to sparse shrubby desert, sagebrush flats, grassland, sandhills, chaparral slopes, and oak-hickory woodland; generally in open areas with sandy or loamy soil, though rocks may be present.			•	
California (common) kingsnake	<i>Lampropeltis getulus californiae</i>	Wide distribution, occurs in nearly all habitats (exclusive of high mountains), is most abundant in valley-foothill riparian situations and in other habitats occurring in the vicinity of irrigated agriculture.			•	
Western long-nosed snake	<i>Rhinocheilus lecontei lecontei</i>	Deserts, prairies, arid river valleys, shrubland.			•	
Sidewinder	<i>Crotalus cerastes</i>	Open desert terrain in fine windblown sand, desert flats with sandy washes or sand dunes sparsely vegetated with creosote bush or mesquite; sometimes in rocky or gravelly sites.			•	
Southern desert horned lizard	<i>Phrynosoma platyrhinos calidarium</i>	Areas of sandy, gravelly soil, windblown sand; flat arid stretches where rocks or scrub vegetation are present.				•

Sources: BLM 2003e, NDOW 2004a, CDFG 2004, NPS 2004.

3.13.3.3 Nevada Natural Heritage Program

The NNHP is designed to coordinate the resource needs of Nevada's diverse biological heritage with human activities. This effort is accomplished by maintaining a detailed inventory and up-to-date databases on the locations, biology, and conservation status of all Threatened, Endangered, and Sensitive Species and biological associations in Nevada. These data are used to assist with the evaluation of conservation priorities and to supply information to meet conservation, planning, development, land management, and research needs (NNHP 2004a).

The NNHP provides the citizens of Nevada with a cost-effective "early warning system" designed to minimize future resource conflicts and to help prevent species from becoming threatened or endangered by encouraging less-costly, less-burdensome, and more-proactive conservation measures now. As of August 5, 2002, the State of Nevada has approximately 181 Clark County plants and animals on the Sensitive Animals and Plant and Lichen Lists and on the Nevada Plant and Animal Watch List (NNHP 2004a).

3.13.3.4 Clark County Multiple Species Habitat Conservation Plan

Clark County, in conjunction with federal and State agencies, as well as local communities, prepared the *Clark County MSHCP* (CCDCP 2000) for Clark County, Nevada, for the purpose of supporting the issuance of a permit(s) under Section 10(a) of the ESA to "(1) allow the 'take' of threatened or endangered species resulting from otherwise lawful activities on non-federal properties within the county and (2) allow the 'take' of threatened or endangered species that are currently unlisted but may become listed in the future" (CCDCP 2000). The intent and purpose of the MSHCP was to "establish a means to address the conservation needs of the entire range of biological resources within Clark County" in a cooperative implementation effort among the USFWS, BLM, United States Forest Service (USFS), National Park Service (NPS), NDOW, and other federal and State land managers and regulators (CCDCP 2000). The MSHCP does not provide for incidental take on federal lands or resulting from federal action on non-Federal lands but does provide a framework for avoidance and minimization of impacts to species from these actions.

The MSHCP approaches conservation needs of plant and wildlife species and their habitats on an ecosystem basis to provide a landscape-scale perspective. The *Clark County MSHCP* (CCDCP 2000) defines covered species as—

- Those species for which sufficient information is available and adequate management prescriptions exist or can easily be defined and implemented to support an application for a Section 10(a) incidental take permit(s)
- Those species for which information is, if available, not sufficient, but are known to share habitat with other covered species
- Those species whose listing appears imminent unless conservation measures are instituted that which would likely ensure survival and recovery of such species in the wild.

High-priority-evaluation species are those "for which additional information is required or for which sufficient management prescriptions are unlikely to be able to be defined and implemented sufficiently to support an application for a 10 (a) Permit" (CCDCP 2000). A total of 20 covered and 7 high-priority-evaluation wildlife species (excluding invertebrates) are within these three ecosystems.

3.13.4 Sloan Canyon Potential Habitat Models

As part of this planning process, BLM developed potential habitat models for six Special Status Species either known to occur or with the potential to occur within the NCA. The species, chosen mostly because of their special status designation by BLM and NDOW, include the desert tortoise, Gila monster, chuckwalla, desert bighorn sheep, phainopepla, and prairie falcon. Physical habitat characteristics (i.e., slope, vegetation) of each species were compared against existing GIS data to determine areas of potential habitat for each species. The models vary in generality and precision, due in part to the amount of available quantitative habitat information and the frequent qualitative nature of existing information (United States Geological Society [USGS] 2005).

3.13.4.1 Desert Tortoise

Declines in desert tortoise populations became a major concern in the 1970's because of direct take by humans; habitat loss, degradation, and fragmentation; predation; diseases; and droughts (USFWS 1994). The Mojave population of desert tortoise was listed as threatened in 1990 in the northern and western parts of its range, and six distinctive population segments were identified for critical habitat protection in 1994 following the guidelines set by the recovery plan released the same year. The population segments are representative of distinctive climatic, floristic, and geographic regions (USGS 1997).

The desert tortoise ranges from the Mojave and Sonoran deserts of southeastern California and southern Nevada south through Arizona into Mexico. Desert tortoises in Nevada typically live in flats, alluvial fans, bajadas, and rocky terrain. They construct extensive burrows up to 9 feet (3 m) in length that are often shared with other tortoises; therefore, areas containing friable soil are indicators of desert tortoise habitat. Plant species also play a major role in tortoise habitat. Creosote bush, burrobrush, Mojave yucca, and blackbrush generally distinguish tortoise habitat at lower elevations, with Joshua tree and galleta grass at higher elevations (USGS 1997). Potential desert tortoise habitat within the NCA is presented in Figure 3.13.

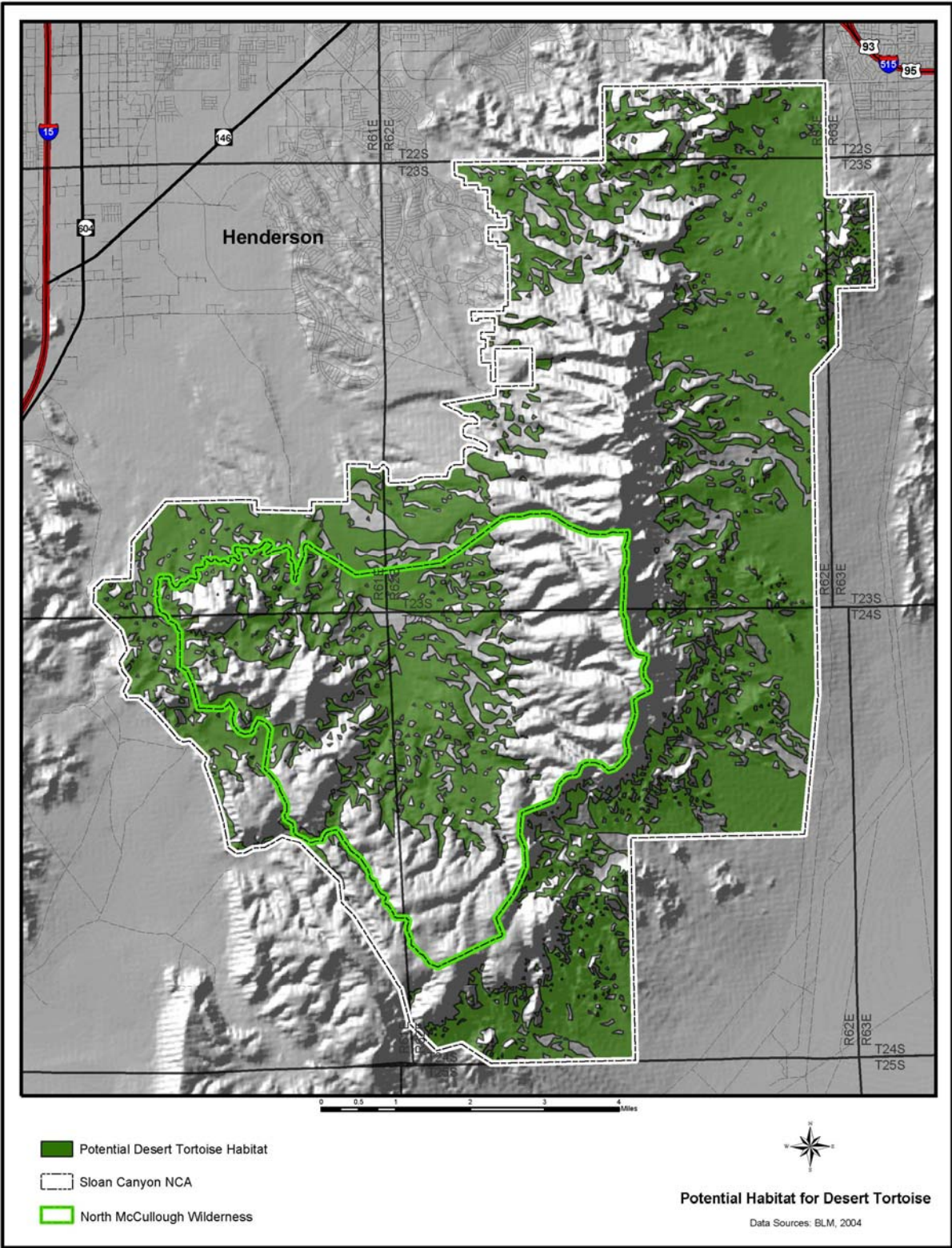
3.13.4.2 Gila Monster

In the State of Nevada, the Gila monster is a BLM-sensitive and State-protected species. Reasons for the protected status include habitat loss attributed to urbanization and some agricultural uses, illegal collection, restricted range in Nevada, and limited knowledge and information. Currently, collection (commercial or personal) of Gila monsters is prohibited in Nevada.

The Gila monster is primarily a desert species and is one of only two species of venomous lizards in the world. It occurs in extreme southwestern Utah, the southern tip of Nevada, southwestern New Mexico, Arizona, and Sonoran Desert. The northern subspecies is the banded Gila monster, and the southern subspecies is the reticulated Gila monster. Although range maps and published accounts indicate the presence of Gila monsters in the Mojave Desert, little is known about the species in the Mojave Desert of Nevada (Gienger 2003).

A model of habitat suitability conducted by C.M. Gienger (2003) indicates that in southern Nevada a wide range of elevation and surface geological features describe habitat used by Gila monsters. Gienger found Gila monsters in Nevada occurring at a range of 1,312 to 3,937 feet (400 to 1,200 meters). Refuge (shelter) site selection differs seasonally and seems to be influenced primarily by seasonal differences in thermal environments. Gila monsters choose deeper shelter sites, as temperatures get hotter in the spring and summer, and shallow sites during early spring and fall when temperatures are cooler. Gila monsters in Nevada spend roughly one-third of the year in hibernation with greatest surface activity in late spring

Figure 3.13. Potential Habitat for Desert Tortoise



(May-June). Home range sizes for Gila monsters in Nevada are larger than those in Utah and Arizona. They travel almost twice as far per bout of activity. This may be because of decreased production in Nevada relative to the other States, which causes the need to forage over greater areas to acquire the same food sources. Relative to the NCA, Gienger (2003) found the North McCullough Range as medium-to-high suitability for Gila monster habitat. Potential Gila monster habitat within the NCA is presented in Figure 3.14.

3.13.4.3 Chuckwalla

The chuckwalla is a BLM-sensitive species whose population may be at risk because of the high amount of collection for the commercial pet trade. Currently, only Nevada allows commercial collection of the chuckwalla for pet trade with most collection beginning in March and continuing until the end of September. Most of the animals collected for commercial pet trade are potentially breeding adults (Brodie et al. 2003).

Chuckwallas occur in southeastern California, southern Nevada, southwestern Utah, western Arizona, eastern Baja California, and northwestern Mexico. They are found in various desert woodland and scrub habitats but are frequently associated with creosote communities. Strictly a rock dweller, the chuckwalla is found in areas with large rocks, boulder piles, or large rock outcrops on slopes of the Great Basin, Mojave, and Sonoran Deserts (California Department of Fish and Game [CDFG] 2004). The relative abundance of chuckwallas appears to be a function of the quality of the rocks that contain suitable crevices for retreat and rock piles that provide basking sites (Brodie et al. 2003). Potential chuckwalla habitat within the NCA is presented in Figure 3.15.

Chuckwallas are active primarily in March through August with greatest activity in the spring. The active season is over by mid-August, and hibernation occurs the remainder of the year. Chuckwallas exhibit little or no detectable migration and tend to be long-lived lizards with high adult survivorship, low juvenile survivorship, and infrequent breeding. These traits make the species susceptible to slow recovery rates should a population crash occur (Brodie et al. 2003).

3.13.4.4 Desert Bighorn Sheep

The desert bighorn sheep, a subspecies of the Rocky Mountain bighorn sheep, is a BLM-sensitive and State-protected species. Reasons for this status include exploitive hunting, disease, habitat destruction, competition from burros, and overgrazing by livestock. Over the past 12 years, desert bighorn numbers have stabilized or increased slightly as a result of reintroduction to former habitat, water developments, and favorable land use decisions (BLM 1998c).

Desert bighorn sheep are indigenous to the hot desert ecosystems of the Southwest. They range from Nevada and California to west Texas and south into Mexico. Desert bighorn historically occupied the central and southern portions of Nevada, and the State currently supports one of the largest modern populations in the United States (BLM 1998c).

Desert bighorn prefer terrain that is rough, rocky and steep, broken up by canyons and washes, and they live in regions of the State marked by hot summers and little annual precipitation. Bighorn sheep require access to freestanding water during summer months, and in drought conditions they may water throughout the year (NDOW 2004b). The breeding season or rut generally extends from July through September, with the lambing season beginning in December and ending in June (Blue Planet Biomes 2002).

Figure 3.14. Potential Habitat for Gila Monster

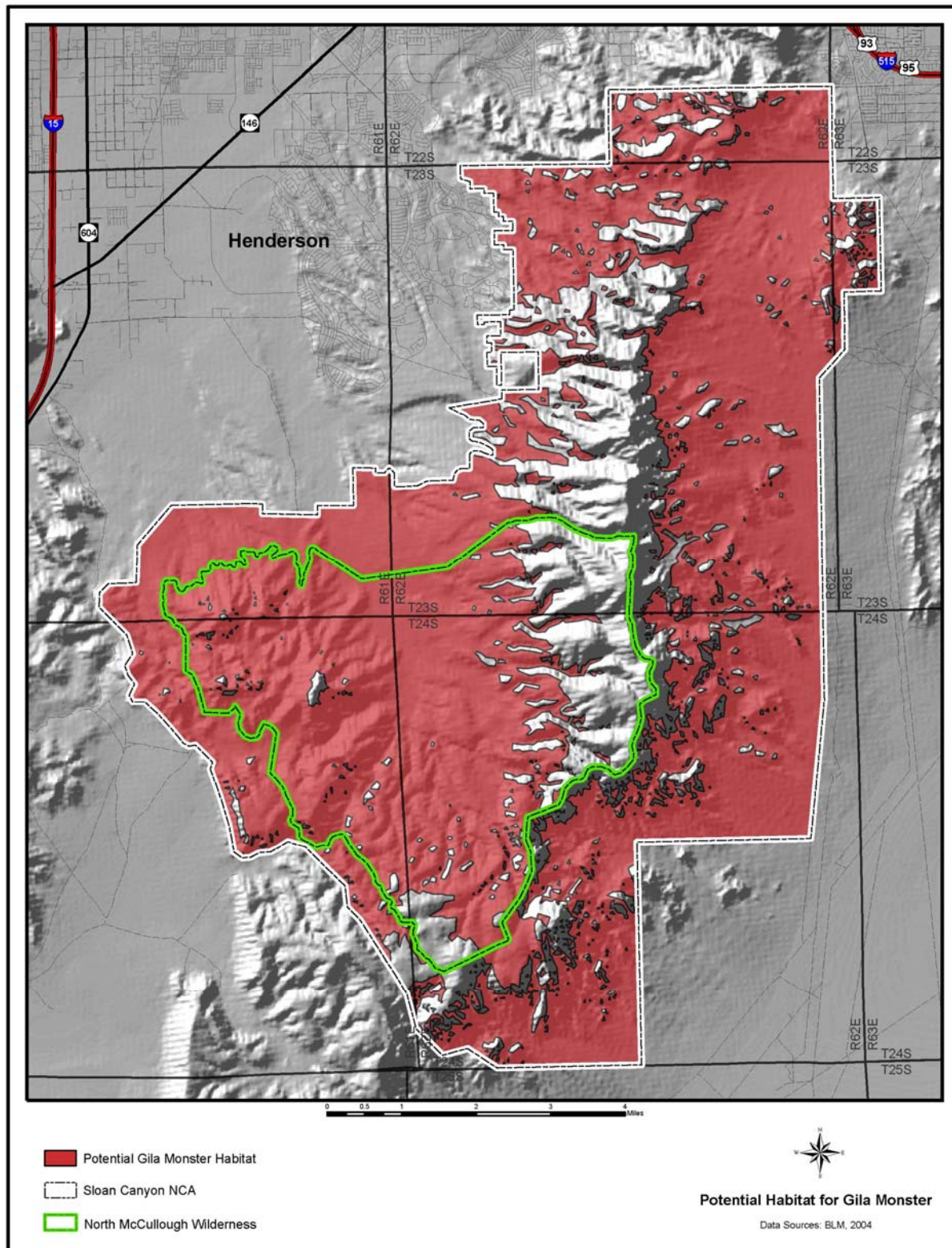
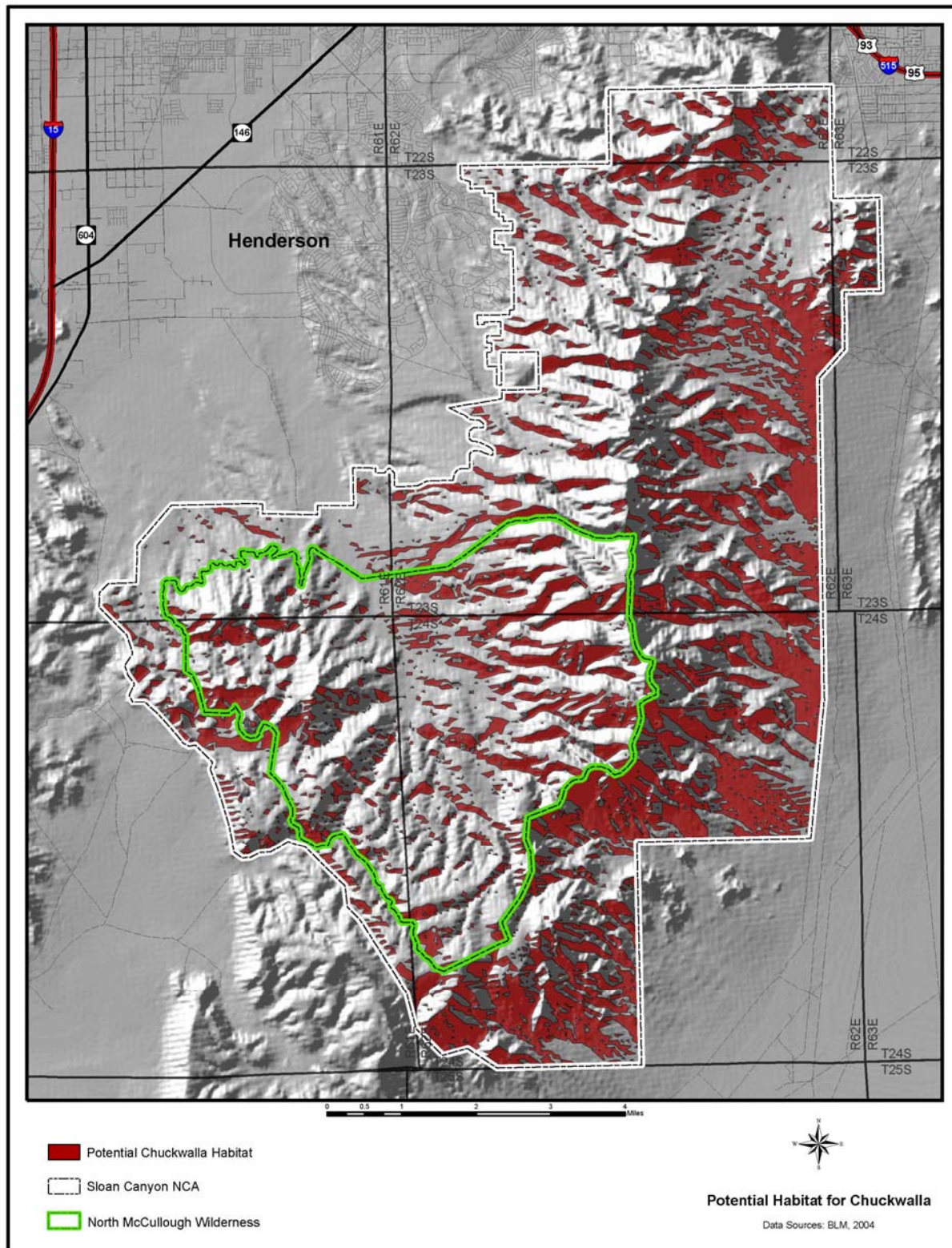


Figure 3.15. Potential Habitat for Chuckwalla



The *Rangewide Plan for Managing Habitat of Desert Bighorn Sheep on Public Lands* (BLM 1998c) provides guidance and sets forth priorities for a program to manage desert bighorn sheep habitat on BLM lands in Arizona, California, Colorado, Nevada, New Mexico, and Utah. The goal of the program is to facilitate recovery of desert bighorn in the Southwest through a balanced program of inventory, on-the-ground projects, monitoring, and research. The objectives of the Rangewide Plan are to facilitate the recovery of desert bighorn sheep in 115 identified habitat areas. The McCullough Mountain Range is one of the 115 habitat areas on BLM land with remnant herds that are capable of supporting viable populations. Bighorn sheep summer habitat and winter range model was developed in conjunction with the U.S. Geological Survey and is presented in Figure 3.16.

3.13.4.5 Phainopepla

The phainopepla is a BLM sensitive, State-protected, and *Clark County MSHCP* (CCDCP 2000) covered species. The main threat to the phainopepla is habitat loss due to urban and some agricultural land development, fires, OHV damage, illegal cutting of mesquite for fuel wood, and construction of gravel pits. Population trends of the phainopepla are being researched in Nevada (NDOW 2004b).

Phainopepla occur in the southwest United States (southern and central California, southern Nevada, Arizona, southern Utah, southern New Mexico, and western and southern Texas) south to Baja California and into Mexico. It is found in desert, shrubland, riparian, and woodland habitats and is generally associated with areas supporting desert trees bearing mistletoe. In Nevada, these trees typically are mesquite, catclaw acacia, and juniper (NDOW 2004b). The potential phainopepla habitat was modeled based on potential acacia habitat and is presented in Figure 3.17.

3.13.4.6 Prairie Falcon

The prairie falcon is a BLM-sensitive and State-protected species. The main threat to the prairie falcon is human disturbance of nesting sites.

The prairie falcon is an uncommon permanent resident and migrant that ranges from southeastern deserts northwest along the inner Coast Ranges and Sierra Nevada. It is distributed from annual grasslands to alpine meadows but associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. Prairie falcons use open terrain for foraging and nest in open terrain with canyons, cliffs, escarpments, and rock outcrops that overlook open areas for hunting. Because specific falcon data are not available, potential nesting and fledging habit was modeled based on general raptor habitat characteristics (Figure 3.18).

3.14 WILDLAND FIRE MANAGEMENT

Wildfire is of minimal concern in the Sloan Canyon NCA, as the historical fire record for the area shows almost no fire occurrence. Natural lightning ignitions could occur but are not common because of the sparseness and short stature of the vegetation, particularly on the rocky slopes and the ridgetops. There is potential for human-caused ignitions, but it pertains primarily to the more accessible valley bottoms.

Even if ignited, the distribution and density of vegetation within the NCA would not allow fire to carry and spread. One scenario, in which a hot, dry fire season following successive years of above-normal precipitation, could pose a possible exception. The wet conditions would contribute to an atypical build-up of grass and shrub fuels, whereas the subsequent hot and dry conditions would increase the risk of ignitions. In realistic terms, only the valley bottoms and bajadas of Hidden Valley are prone to such a vegetative build-up. Swales of native galleta grass co-dominate these areas along with creosote bush and

Figure 3.16. Bighorn Sheep Habitat

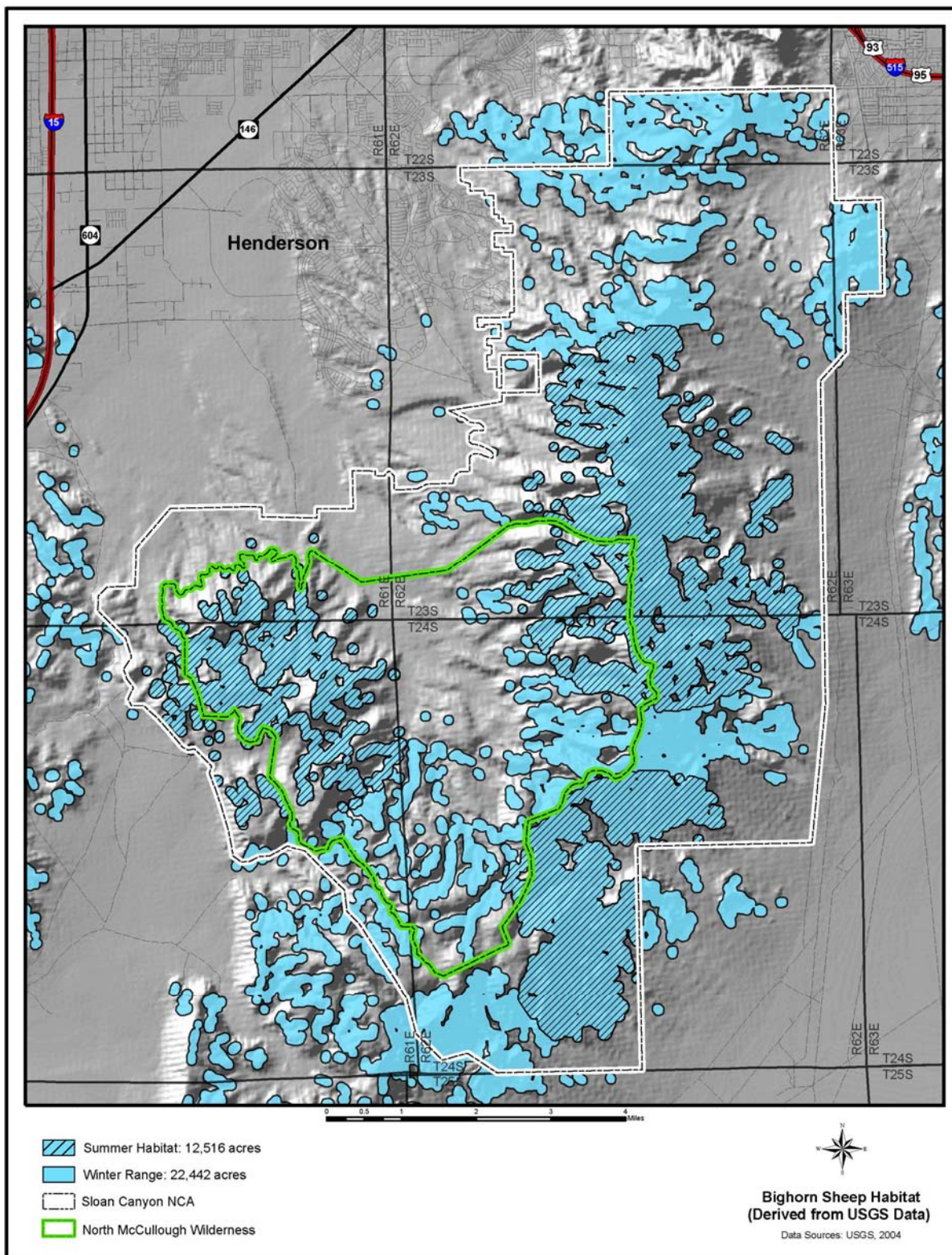


Figure 3.17. Potential Habitat for Phainopepla

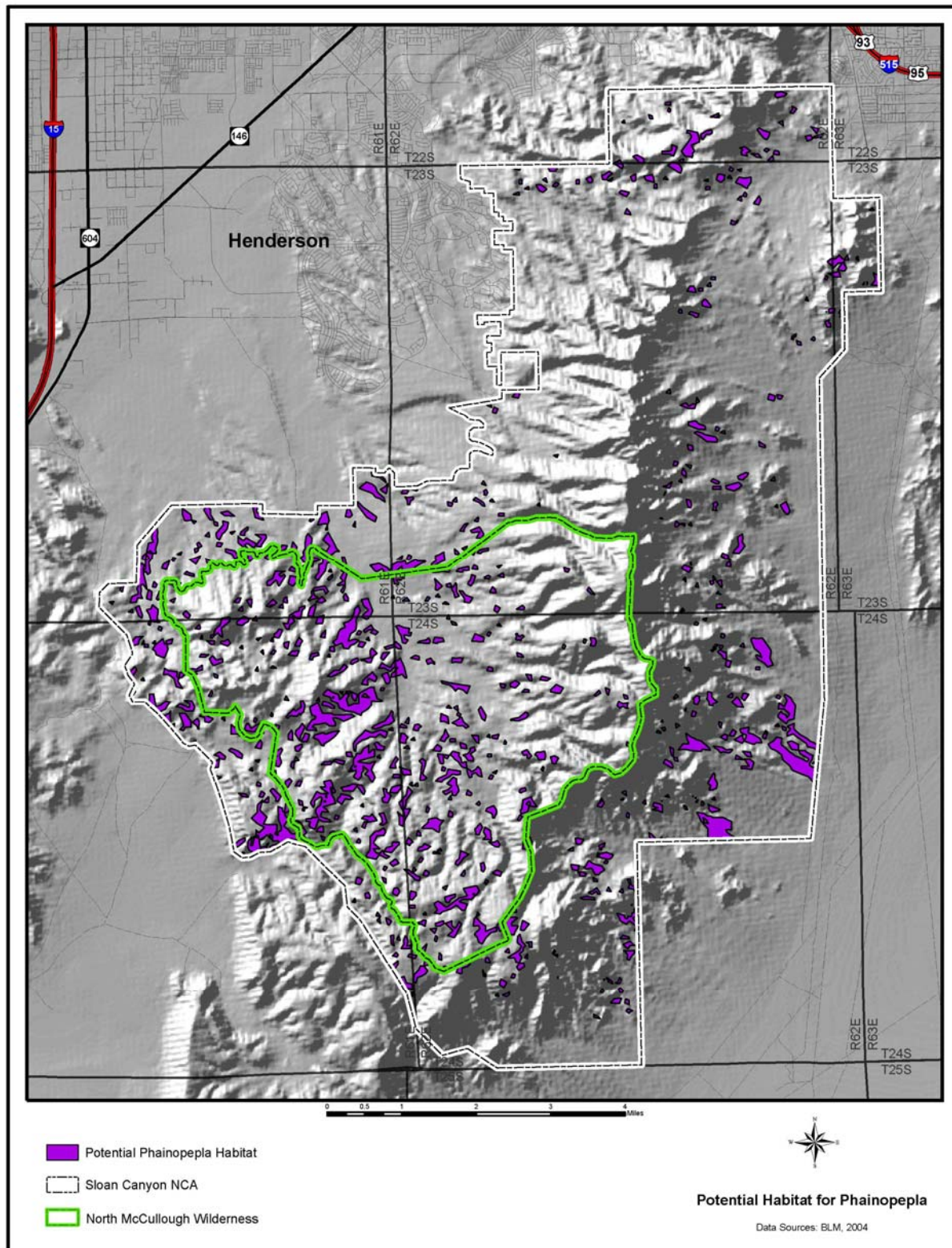
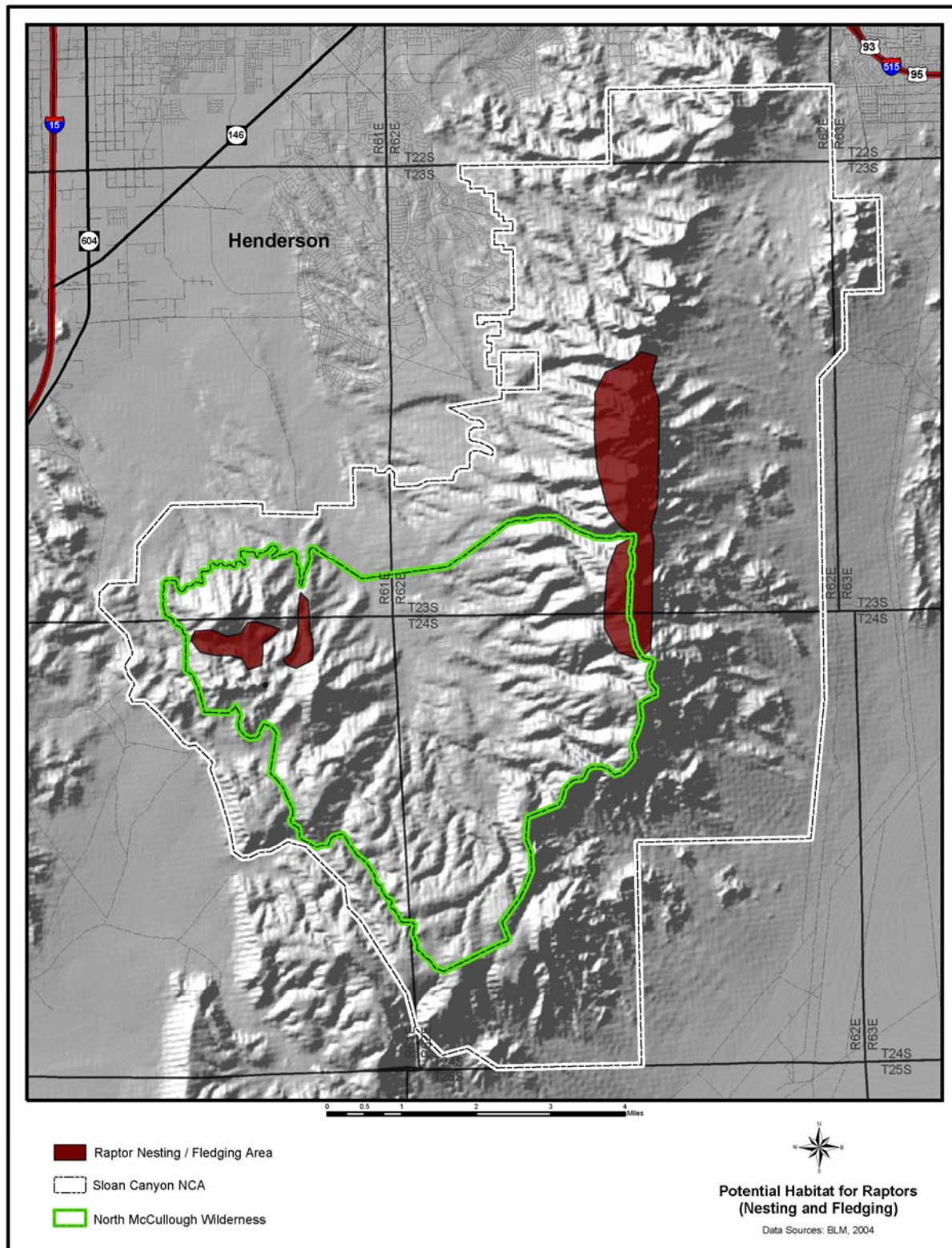


Figure 3.18. Potential Habitat for Raptors (Nesting and Fledging)



white bursage. Under optimal conditions, a wildfire of several hundred acres could potentially occur; however, the fire would be unlikely to pose a threat either to the NCA environment or to human life and property values. The steep, bare rocky slopes on the NCA boundary would prevent fire from spreading upslope into the NCA proper, and this remote location does not contain any facilities, infrastructure, or developments.

The BLM Las Vegas Field Office Fire Management Plan (BLM 2004b) and the *Las Vegas RMP* (BLM 1998a) provide current management direction for fire. The main objective in the *Las Vegas RMP* is to provide fire suppression efforts commensurate with resources and adjacent property values at risk. Further direction from the RMP divides the planning area into fire suppression zones. All of the Sloan Canyon NCA falls within Zone 2B. This zone is characterized by critical desert tortoise and bighorn sheep habitat, little rainfall, and a higher percentage of ephemeral/perennial plant communities as compared with other zones. The objective for managing this Fire Management Unit is to allow degraded vegetative communities to ecologically improve over time through the use of moderate suppression tactics. The maximum acceptable burn acre per incident is 1 acre with maximum acceptable burn acreage per year of 50 acres. Constraints in the plan include minimizing off-road travel, road surface disturbance, permitting use of foam and retardant, and the existence of wildland urban interface areas.

Fire fuels management has not been practiced in the Sloan Canyon vicinity because of the lack of fire threat posed by the local vegetative characteristics. There is no anticipation of any future desire or need for fire fuels management actions to be taken in the Sloan Canyon NCA vicinity.

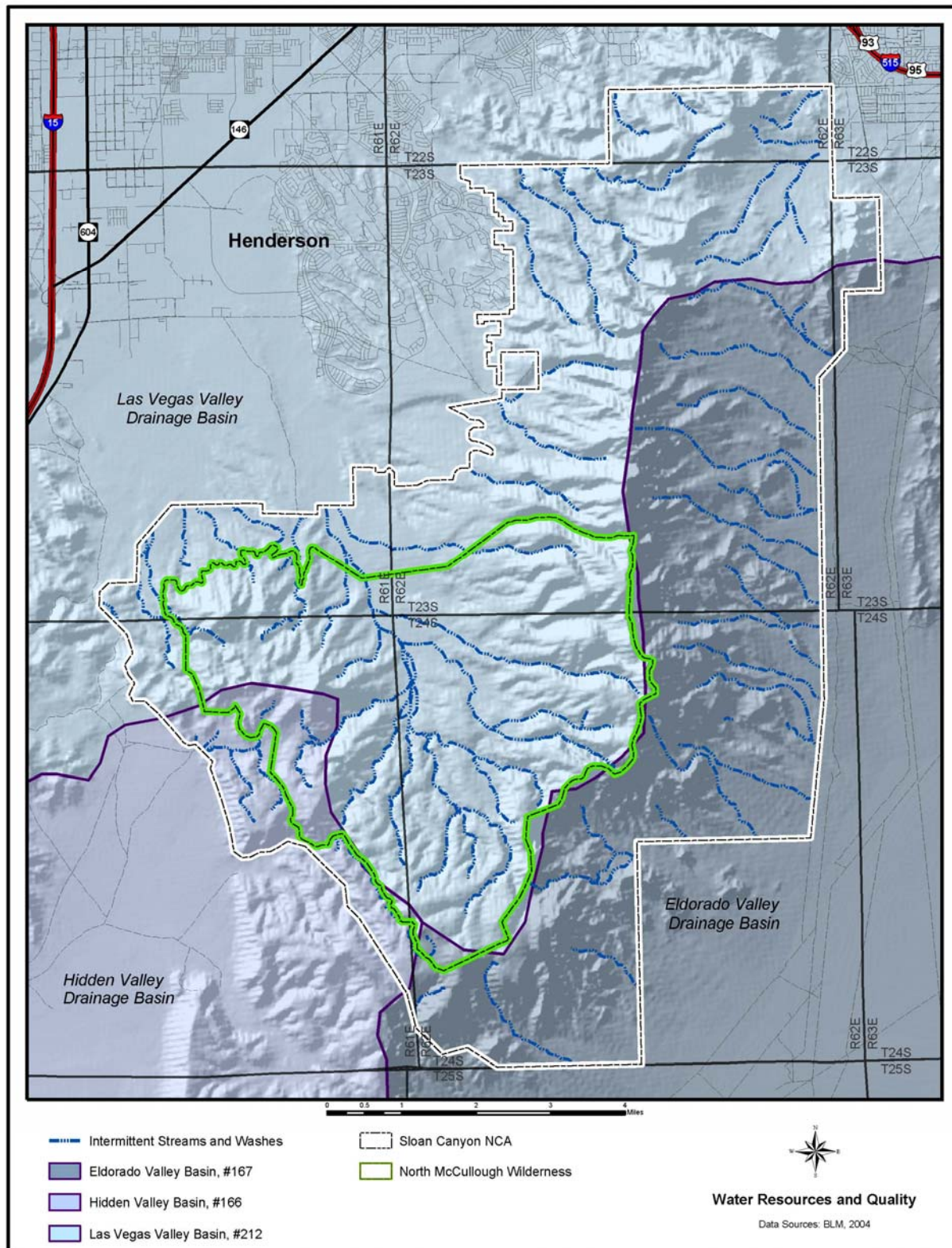
A Memorandum of Understanding (MOU) is either in place or being developed with other agencies regarding initial attack suppression that would apply to fire management in the NCA. Completed MOUs include statewide MOUs with the Nevada Division of Forestry, the USFS, and the NPS (in the vicinity of Lake Mead), and they cover initial attack and suppression as well as dispatch. Other MOUs are being developed with local governments, including the City of Henderson, Las Vegas, and Clark County, regarding initial attack in the vicinity of the Sloan Canyon NCA.

3.15 WATER RESOURCES AND QUALITY

The NCA straddles the hydrographic boundary between the Colorado River Basin and the Central Region Basin. The canyons, fans, and washes of the northwestern and central portion of the NCA drain into Las Vegas Valley, a tributary of the Colorado River system. The steep eastern canyons and fans direct runoff into the closed basin of Eldorado Valley, which is separated from the Colorado River system by one low mountain range. Ephemeral stream flows in the southwestern portion of the NCA enter Hidden Valley, also a closed basin (Figure 3.19).

The drainages of the McCullough Range are typically simple dendritic systems originating on the upper slopes of the range. On the uplifted eastern side of the NCA, the drainages form narrow, steep-gradient canyons that travel short distances before contributing to the broad fans of the Eldorado Valley. The drainages cut through less-resistant rocks, typically volcanoclastic ashflows, breccias, and weak tuffs, but often run relatively level across resistant surfaces of lava flows or welded tuffs. When drainages encounter resistant surfaces, the canyon floors tend to be level or stepped, and small water catchments, or tinajas, may form. The relatively low-gradient drainages of the western mountain front have cut broad, deep canyons into the unconsolidated sedimentary rocks. Surface flows eventually coalesce into broad washes that drain into Las Vegas or Hidden Valley. Tinajas are relatively rare in the western portion of the NCA; however, they are present where a steep canyon exposes a resistant surface, such as Sloan Canyon proper.

Figure 3.19. Water Resources and Quality



The watersheds within the NCA have experienced little development or human modification, although remnants of several very small dams exist. A few of the NCA drainages have been altered by culverts along dirt roadways, and detention basins inside and outside the NCA boundary provide temporary storage capacity for peak flow from storm events and control the release of flows to protect downstream structures from flooding.

No perennial streams exist within the NCA, but high-intensity thunderstorms can produce rapid runoff and flash flooding, which can result in floodwater and sediment damage. Sloan Canyon hosts an ephemeral stream where water is found in the channel only during, and immediately after, rainstorms. Buried step pools, currently filled with sand and gravel, serve as an important water resource for the Sloan Canyon ecosystem. Numerous high water marks indicate the susceptibility of Sloan Canyon to relatively frequent flood events. Organic and inorganic debris is present along the entire length of the channel, and high water marks in the narrows are 6 feet above the channel bottom.

3.15.1 Groundwater Resources

Because of the steep bedrock terrain, essentially no groundwater sources exist in the Sloan Canyon NCA; however, the range does provide a relatively small amount of recharge to alluvial aquifers in adjacent valleys. Precipitation reaches groundwater reservoirs by infiltrating into streambed channels and alluvial aprons or by infiltrating directly into consolidated rock and percolating vertically and laterally to valley aquifer fill. Very small perched or contact springs occur in the eastern portion of the NCA. The source water for these springs is local rainwater infiltration that has been concentrated where downward migration is inhibited. These springs are not connected with surrounding groundwater basins or regional groundwater flow systems.

3.15.2 Water Quality

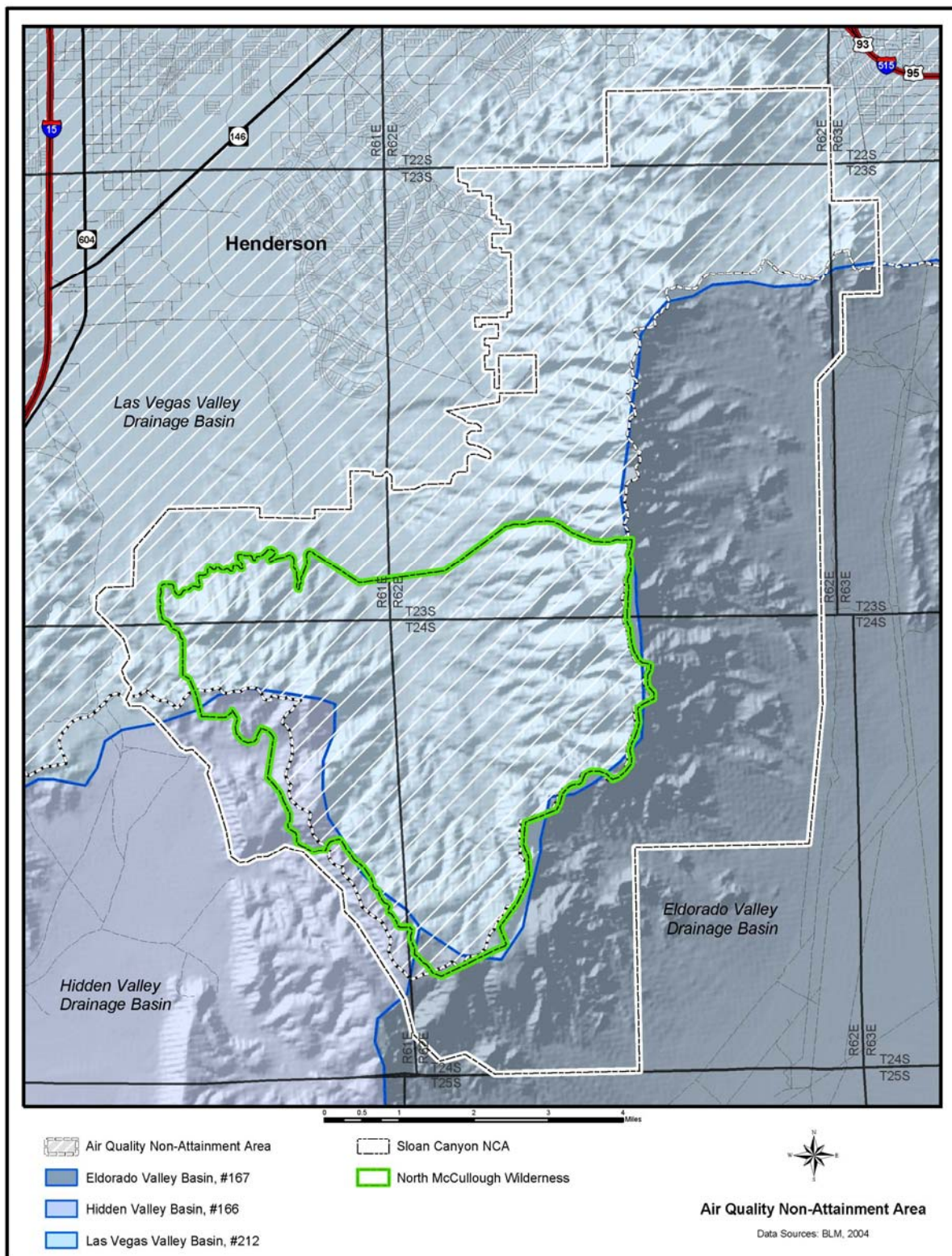
Because of its rugged terrain, limited water, and long-term WSA status, the NCA has experienced little grazing, OHV use, or mineral activities. Therefore, erosion has been low, vegetation cover is good, and essentially no direct contamination has occurred to either surface or groundwater resources (BLM 1998a).

Groundwater within the NCA can be high in total dissolved solids and other naturally occurring compounds resulting from the dissolution of rock-forming minerals. High concentrations of bacteria could occur naturally in small ephemeral springs and seeps.

3.16 AIR QUALITY

The NCA is located in three airsheds: Las Vegas Valley (Hydrographic Basin 212), Hidden Valley (Hydrographic Basin 166), and Eldorado Valley (Hydrographic Basin 167) (Figure 3.20). In 1993, the Las Vegas Valley was designated as serious nonattainment for particulate matter with a mean aerodynamic diameter of 10 μm or less (PM_{10}). In 1997, it was designated as serious nonattainment for carbon monoxide (CO) and in 2004 designated as “basic” nonattainment for the newly implemented 8-hour ozone (O_3) standard promulgated by the Environmental Protection Agency (EPA). The Hidden Valley airshed is a Prevention of Significant Deterioration air quality area and the Eldorado Valley airshed is a Management Area.

Figure 3.20. Air Quality Non-Attainment Area



3.16.1 Ambient Air Quality

The Clark County Department of Air Quality and Environmental Management (DAQEM) operates a state-of-the-art system of near-real-time air quality instruments to constantly measure the ambient concentrations of criteria pollutants of particulate matter less than 10 microns in diameter (PM₁₀); and (PM_{2.5}), carbon monoxide (CO), ozone (O₃), nitrogen oxides (NO and NO₂), sulfur dioxide (SO₂), chlorine (CL₂), and hydrogen sulfide (H₂S) are monitored as special projects. Twenty monitoring locations are spatially distributed throughout Hydrographic Basin 212 as well as outlying site locations based upon emission source distribution and population exposure.

3.16.2 Ambient Air Quality Concentrations

The EPA established the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. These pollutants are those compounds that cause or contribute to air pollution that could endanger public health and the environment. The NAAQS for criteria pollutants are presented in Table 3.7. Ambient air concentration refers to the mass of pollutants present in volume of air and can be reported in units of micrograms per cubic meter (µg/m³) or parts per million (ppm).

Table 3.7. National Ambient Air Quality Standards

Pollutant	Standard	Standard Value*	Standard Type
Carbon Monoxide (CO)	8-Hour Average	9 ppm (10 mg/m ³)	Primary
	1-Hour Average	35 ppm (40 mg/m ³)	Primary
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.053 ppm (100 µg/ m ³)	Primary and Secondary
Ozone (O ₃)	1-Hour Average	0.12 ppm (235 µg/ m ³)	Primary and Secondary
	8-Hour Average	0.08 ppm (157 µg/ m ³)	Primary and Secondary
Lead (Pb)	Quarterly Average	1.5 µg/ m ³	Primary and Secondary
Particulate Matter (PM ₁₀)	Annual Arithmetic Mean	50 µg/ m ³	Primary and Secondary
	24-Hour Average	150 µg/ m ³	Primary and Secondary
Particulate Matter (PM _{2.5})	Annual Arithmetic Mean	15 µg/ m ³	Primary and Secondary
	24-Hour Average	65 µg/ m ³	Primary and Secondary
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	0.03 ppm (80 µg/ m ³)	Primary
	24-Hour Average	0.14 ppm (365 µg/ m ³)	Primary
	3-Hour Average	0.50 ppm (1300 µg/ m ³)	Secondary

* Parenthetical value is an approximate equivalent concentration. mg/m³=milligrams per cubic meter of air, and µg/ m³=micrograms per cubic meter of air.

Source: CCDAQEM 2003b.

3.16.3 Criteria Pollutants Designated as Nonattainment

This section describes the criteria pollutants that contribute to the Las Vegas Valley airshed's nonattainment designation: particulate matter (PM₁₀), carbon monoxide (CO), and ozone (O₃) (BLM 2004f).

3.16.3.1 Carbon Monoxide

Carbon monoxide (CO) is formed by the incomplete combustion of fossil fuels and other carbon-containing materials. Although the Las Vegas Valley airshed is classified serious nonattainment for CO, there have been no violations of the NAAQS since 1999 (CCDAQEM 2003b). Long-term trends show improving air quality in Las Vegas with respect to CO since the 1980s when violations of the standard occurred between 18 and 41 times per year. A State Implementation Plan (SIP) was prepared by the CCDAQEM and approved by the EPA to achieve CO compliance.

3.16.3.2 Particulate Matter

Particulate material in the atmosphere is produced from various sources. Naturally occurring soil material may be mobilized and transported by surface winds, especially when disturbed by surface activities. The largest sources of particulate matter are from construction activities, vacant lands, and paved and unpaved roads. Vehicles, particularly diesel-powered vehicles, are the major sources of combustion particles within the Las Vegas Valley.

The Las Vegas airshed was designated as serious nonattainment for PM₁₀. In the last 5 years (1999–2003) measurements of particulates have been recorded at more than one location, indicating violations of the 24-hour PM₁₀ standard as set forth by the NAAQS (CCDAQEM 2003b). A SIP was prepared for PM₁₀ by the CCDAQEM and approved by the EPA to achieve compliance. The PM₁₀ nonattainment area for Las Vegas is shown in Figure 3.20 and includes a portion of the Sloan Canyon NCA.

3.16.3.3 Ozone

Ozone (O₃) is produced through a series of chemical reactions of nitrogen oxides with volatile organic oxides in sunlight. Ozone is more prevalent from May to October when sunlight, high temperatures, and stagnant air conditions trigger its formation. Available data on O₃ measurements indicate that air quality in the Las Vegas Valley is not in compliance with the revised 8-hour NAAQS for O₃. The EPA designated Clark County as nonattainment for O₃ on April 15, 2004, but granted a request from the State of Nevada to defer the designation date to mid-September 2004 to allow additional analysis of the nonattainment boundary. The plan is to develop and implement a SIP, prepared by the DAQEM, on how the county would achieve the new 8-hour standard by June 2009.

3.16.4 Air Quality Modeling

In early 2004, Argonne National Laboratory prepared a comprehensive air quality modeling study and supporting field measurements to assess current and future cumulative air quality impacts in the Las Vegas metropolitan urban valley. The modeling effort was completed in support of BLM's ongoing Land Disposition Actions within the BLM disposal boundary. The study used a third-generation, state-of-the-art Eulerian dispersion model (Association Multiscale Air Quality Models-3), along with a fifth-generation prognostic mesoscale meteorological (MM5) model to simulate the influences of atmospheric physics and chemistry on pollutant transport and diffusion (BLM 2004f).

3.17 GRAZING

The Hidden Valley Allotment is the only allotment open to livestock grazing in the Sloan Canyon NCA. Most of the Hidden Valley Allotment is outside the NCA and therefore is not affected by this plan's decisions; however, a portion of the allotment extends north into the NCA and the North McCullough Wilderness (Figure 3.21).

Grazing on the Hidden Valley Allotment is ephemeral, which means that authorization to graze is dependent on climatic conditions and grass production. The permittee may graze the allotment if the BLM Authorized Officer determines forage conditions are suitable for livestock grazing. The permittee does not forfeit the ability to apply if no permit application is made or allotted forage is not used.

Domestic livestock use is limited to cattle in this allotment. Table 3.8 shows the number of cattle that have been authorized to graze on the Hidden Valley Allotment for the past 13 years.

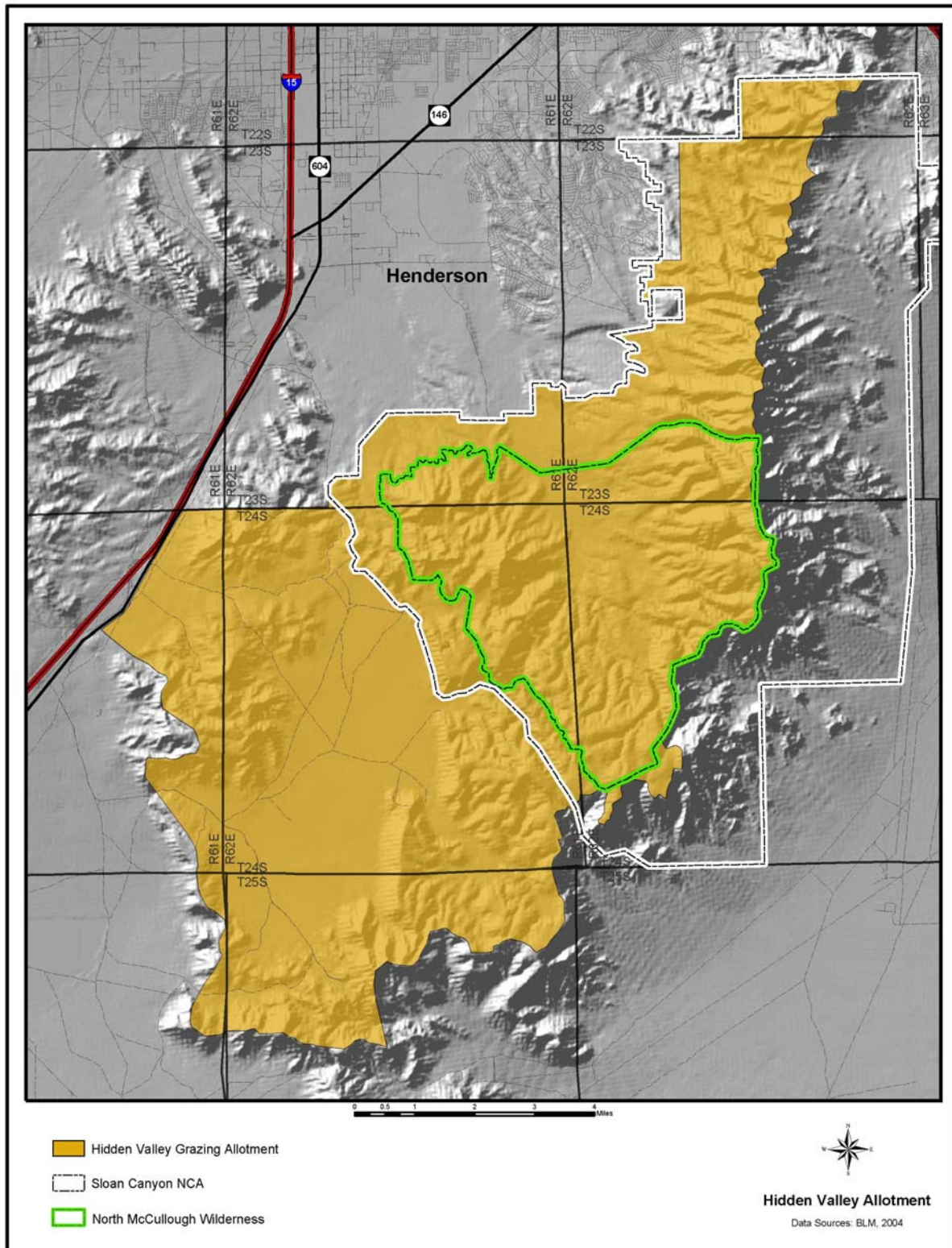
Figure 3.21. Hidden Valley Allotment

Table 3.8. Livestock Grazing on the Hidden Valley Allotment 1990–2002

Licensed Animal Unit Month	Number of Cattle Authorized to Graze	Season Authorized to Graze
177	55	03/01/1990 to 03/19/1990
	65	03/20/1990 to 05/25/1990
51	50	10/31/1990 to 11/30/1990
157	53	12/01/1990 to 02/28/1991
188	62	03/01/1991 to 05/31/1991
24	45	11/15/1992 to 11/30/1992
254	86	12/01/1992 to 02/28/1993
66	100	11/11/1993 to 11/30/1993
296	100	12/01/1993 to 02/28/1994
89	90	10/26/1994 to 11/30/1994
121	90	12/01/1994 to 01/10/1995
53	90	02/11/1995 to 02/28/1995
An application to graze 90 cattle was denied because it was not consistent with the Terms and Conditions of the Biological Opinion to Protect the Desert Tortoise.		03/01/1995 to 04/30/1995
99	100	11/01/1995 to 11/30/1995
284	96	12/01/1995 to 02/28/1996
An application for nonuse of the allotment based on drought conditions was submitted.		1997
41	40	12/01/1999 to 12/31/1999
No applications to graze livestock in the Hidden Valley grazing allotment were received.		2000–2002

Source: BLM 2004g.

Grazing on the Hidden Valley Allotment is supported by hauled water. Water haul locations are strategically placed to avoid wildlife habitat and target grazing use. Although no current water haul locations are within the NCA, at least one is directly adjacent to the NCA boundary in an area of good grass production. Roads that access water haul locations also support grazing, and several roads serve the allotment to the south of the NCA.

3.18 GEOLOGY AND SOILS

3.18.1 Geology

The McCullough Range lies in the southern Basin and Range Province and trends north–south from the New York Mountains in California to the City of Henderson in the Las Vegas Valley. The northern part of the range, where the Sloan Canyon NCA is located, consists of a Precambrian basement overlain by a Tertiary volcanic section. Excellent exposure of this volcanic section is provided in the range’s steep eastern escarpment, which ranges from 2,000 to 3,000 feet high (Bridwell 1991).

The North McCullough Range is unique in that the geology in all other ranges in the southern Nevada region has been highly distorted by extensional faulting associated with the formation of the Basin and Range. There is essentially no faulting within the NCA, so the geologic block is relatively coherent, and the area provides a “textbook” for volcanology (Marrs-Smith personal communication 2004). Although detailed geologic mapping has not occurred within most of the NCA, at least four major volcanic events have been documented: the Henderson Caldera, located near the Anthem development; a 14-million-year-old stratovolcano that forms the ridgeline of the McCullough Range; an explosive caldera event south of NCA in the McCullough Pass area; and in the Hidden Valley area, four volcanoes define a geologic “sag”

(Marrs-Smith personal communication 2004). Volcanic features within the NCA include cinder cones, lava fountaining, and domes of viscous lava.

Despite limited faulting, many of the rock units in the NCA are highly fractured, which strongly influences slope stability, as evidenced by recent rock fall and small-scale landslide events in the Sloan Canyon Petroglyph Site (BLM 2000). Alluvial slopes are near the angle of repose, making maneuvering on them difficult and downslope movement likely, posing risk to both visitors and cultural resources (BLM 2000).

3.18.2 Soils

A combination of published soil surveys of the Las Vegas Valley and unpublished reconnaissance mapping by the National Resource Conservation Service (NRCS) provide a general picture of the types of soils within the NCA (NRCS 1985). The soil types found within the NCA are listed in Table 3.9 and presented in Figure 3.22, NRCS Soil Types in Sloan Canyon NCA.

Soils in the region largely derive from the eroded volcanic rocks that form the McCullough Range. Higher elevations typically consist of rock outcrops, but the clastic nature of the rock units provides high amounts of sand-sized sediment and contributes to the extensive fan system abutting the range. Older fan surfaces, generally higher in elevation and isolated from incised washes, often show intense carbonate cementation underlying a shallow pavement of basalt and rhyolite boulders. Pavements may form on younger fan surfaces in the central basin and on the east side of the NCA, but their formation is inhibited on the older fans due to surface cementation. Downslope, the mid-range alluvial fans contain deeper soils consisting of gravelly sandy loam. At lower elevations and on basin floors, very deep, fine silts, sands, and loams are deposited.

3.19 MINERALS

The Sloan Canyon NCA Act specifically addresses mining claims and states that except for “valid existing rights, all public land . . . is withdrawn from . . . location, entry, and patent under the mining laws; and operation of the mineral leasing, mineral materials and geothermal leasing laws.” Therefore, only valid, existing mineral claims are recognized for this planning process.

No economic metallic minerals, uranium, thorium, or economically viable nonmetallic mineral deposits have been found within the NCA (Great Basin GEM 1983). Just inside the eastern boundary of the NCA, the Railroad Pass district produced a limited amount of gold from the Quo Vadis mine. Gold and silver was produced in 1935 and 1936 from quartz veinlets in sheared andesite (Great Basin GEM 1983).

Within the NCA boundary, there are 11 active mining claims. These claims are located in Township 23 South, Range 61 East and are within or overlap the NCA and portions of the Wilderness. A consortium of investors owns these claims, which are shown in Figure 3.23. The BLM is currently conducting a validity determination on two of the active claims, Black Mountain Number 72 and 73, as part of a land disposal action.

Figure 3.22. NRCS Soil Types Sloan Canyon NCA

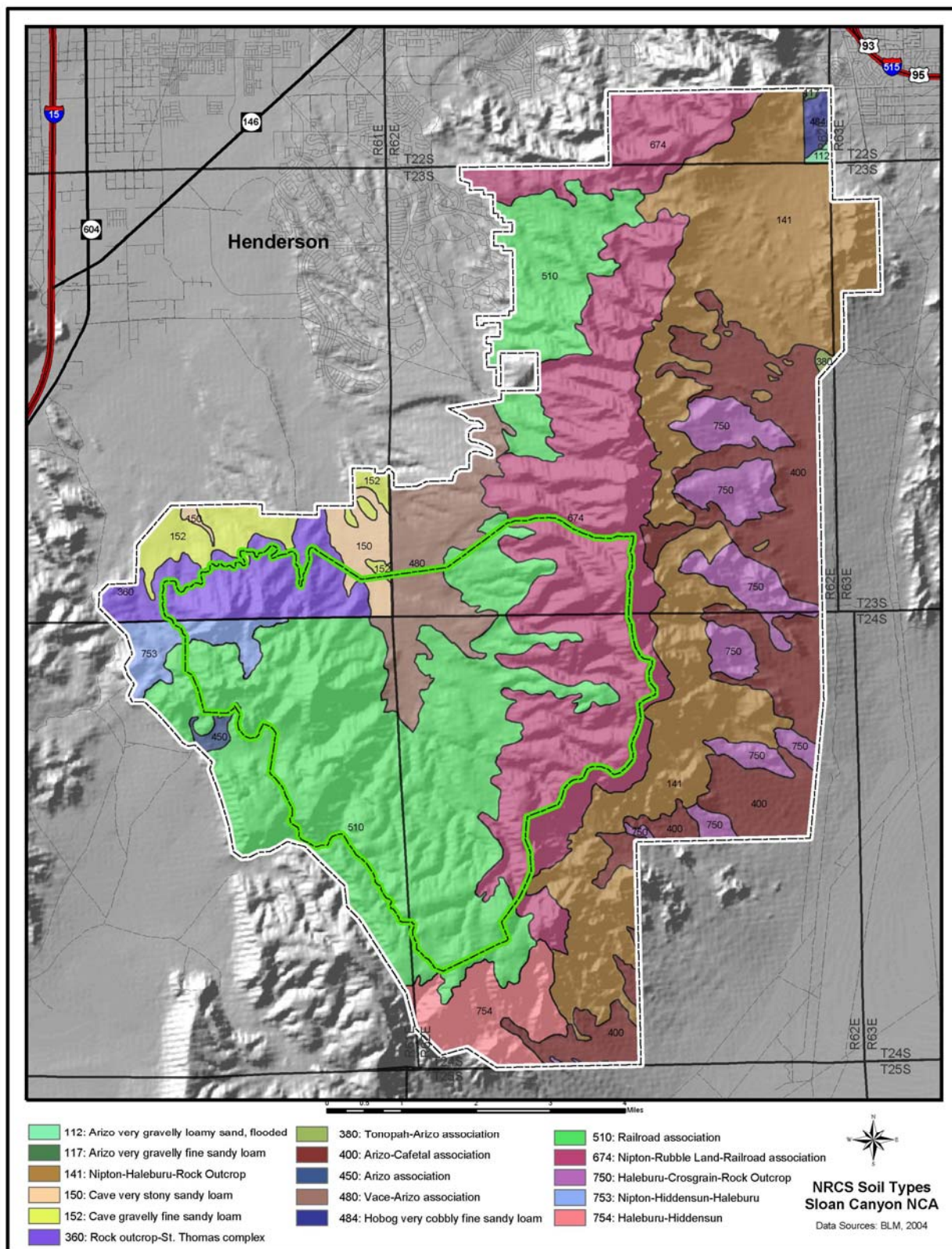


Figure 3.23. Existing Locatable Mineral Mining Claims

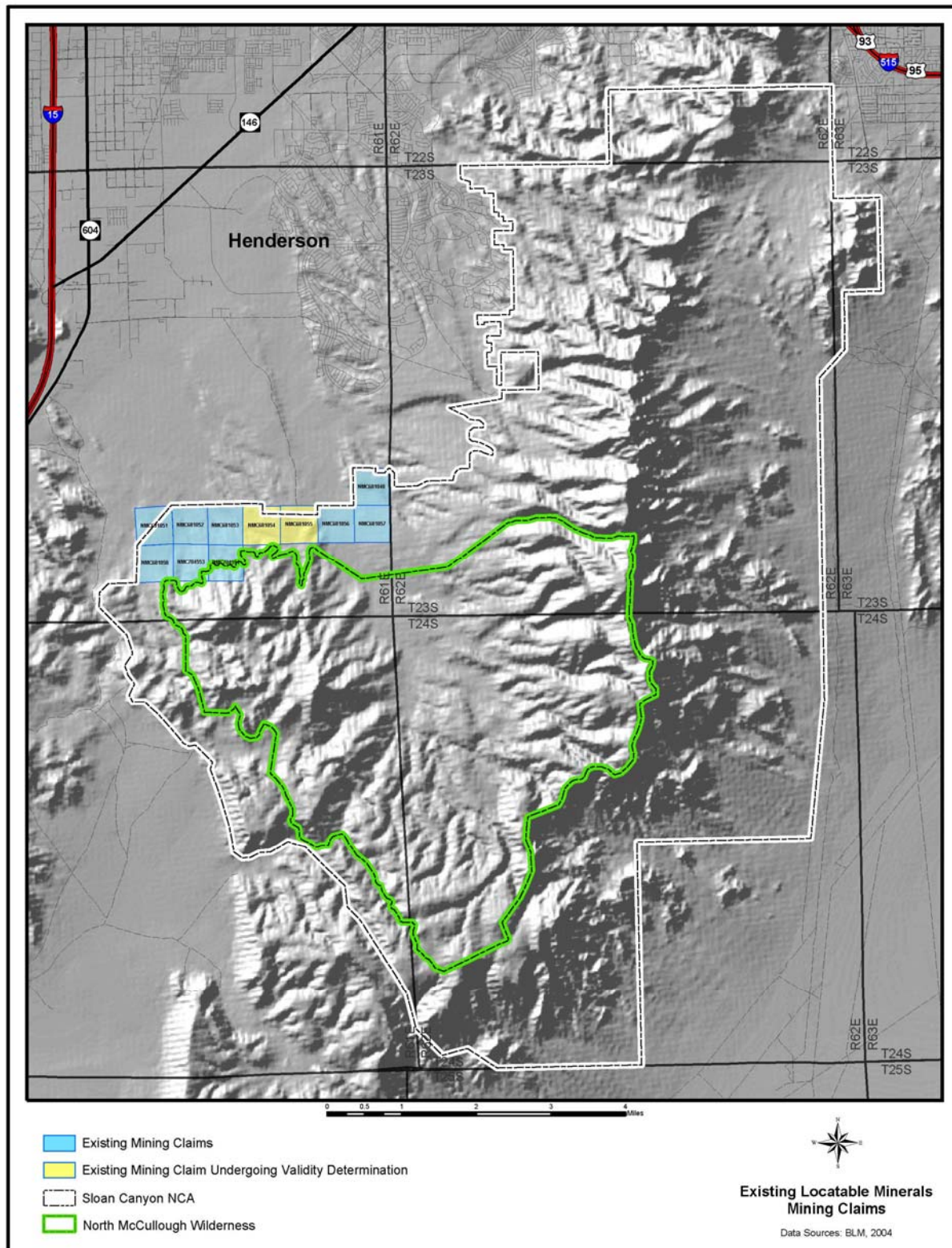


Table 3.9. Soil Types Within Sloan Canyon NCA

Soil Number	Soil/Association Name	Ecological Site Description
112	Arizo very gravelly loamy sand	Deep, excessively drained soils in channels on fan piedmonts; permeability rapid; runoff slow; water erosion hazard slight.
117	Arizo very gravelly fine sandy loam	Very deep, excessively drained soil on alluvial fans and inset fans; permeability very rapid; runoff slow; water erosion hazard slight.
141	Nipton-Haleburu-Rock Outcrop Association	Well-drained soil on backslopes of mountains; permeability moderately rapid; runoff very high.
150	Cave Very Stony Sandy Loam	Shallow, well-drained soil on erosional fan remnants; permeability moderate; runoff slow; water erosion hazard slight.
152	Cave Gravelly Fine Sandy Loam	Shallow, well-drained soil on erosional fan remnants; permeability moderate; runoff slow; water erosion hazard slight.
360	Rock Outcrop - St. Thomas Complex	Shallow, well-drained soil on hills and low mountains; permeability moderately rapid; runoff rapid; water erosion hazard moderate.
380	Tonopah-Arizo Association	Excessively drained soil in intermontane basins; permeability moderately rapid; runoff low.
400	Arizo-Cafetal Association	Excessively drained soil on fan piedmonts; permeability rapid; runoff very low.
450	Arizo Association	Excessively drained soil on fan piedmonts; permeability rapid; runoff very low.
480	Vace-Arizo Association	Well-drained soil on fan piedmonts; permeability moderate; runoff very high.
484	Hobog Very Cobbly Fine Sandy Loam	Shallow, well-drained soil on hills; permeability moderately rapid; runoff rapid; water erosion hazard moderate.
510	Railroad Association	Well-drained soil on lava flows; permeability moderately rapid; runoff high.
674	Nipton-Rubble Land-Railroad Association	Well-drained soil on backslopes of mountains; permeability moderately rapid; runoff very high.
750	Haleburu-Crosgrain Rock Outcrop Association	Well-drained soil on backslopes of mountains; permeability moderately rapid; runoff very high.
753	Nipton-Hiddensun-Haleburu Association	Well-drained soil on backslopes of mountains; permeability moderately rapid; runoff very high.
754	Haleburu-Hiddensun Association	Well-drained soil on summits of mountains; permeability moderately rapid; runoff very high.

Sources: Edmunds personal communication 2003; NRCS 1985.

3.20 ABANDONED MINES

Miners have left a legacy of constructed mining hazards in southern Nevada, which are not always apparent to visitors enjoying outdoor recreation. Common hazards include open shafts, unstable rock, and decayed support structures. The Nevada Division of Minerals, Abandoned Mine Program, was created by legislation in 1987 in response to numerous safety incidents that occurred in abandoned mine openings. The program provides for public safety by identifying and securing dangerous orphaned mine openings (State of Nevada 2001).

To date, 18 abandoned mine sites have been identified within the NCA (Figure 3.24 [Durbin personal communication 2003]). Most of these have been secured through backfilling, although several have been fenced or signed as presented in Table 3.10.

Figure 3.24. Identified Abandoned Mines

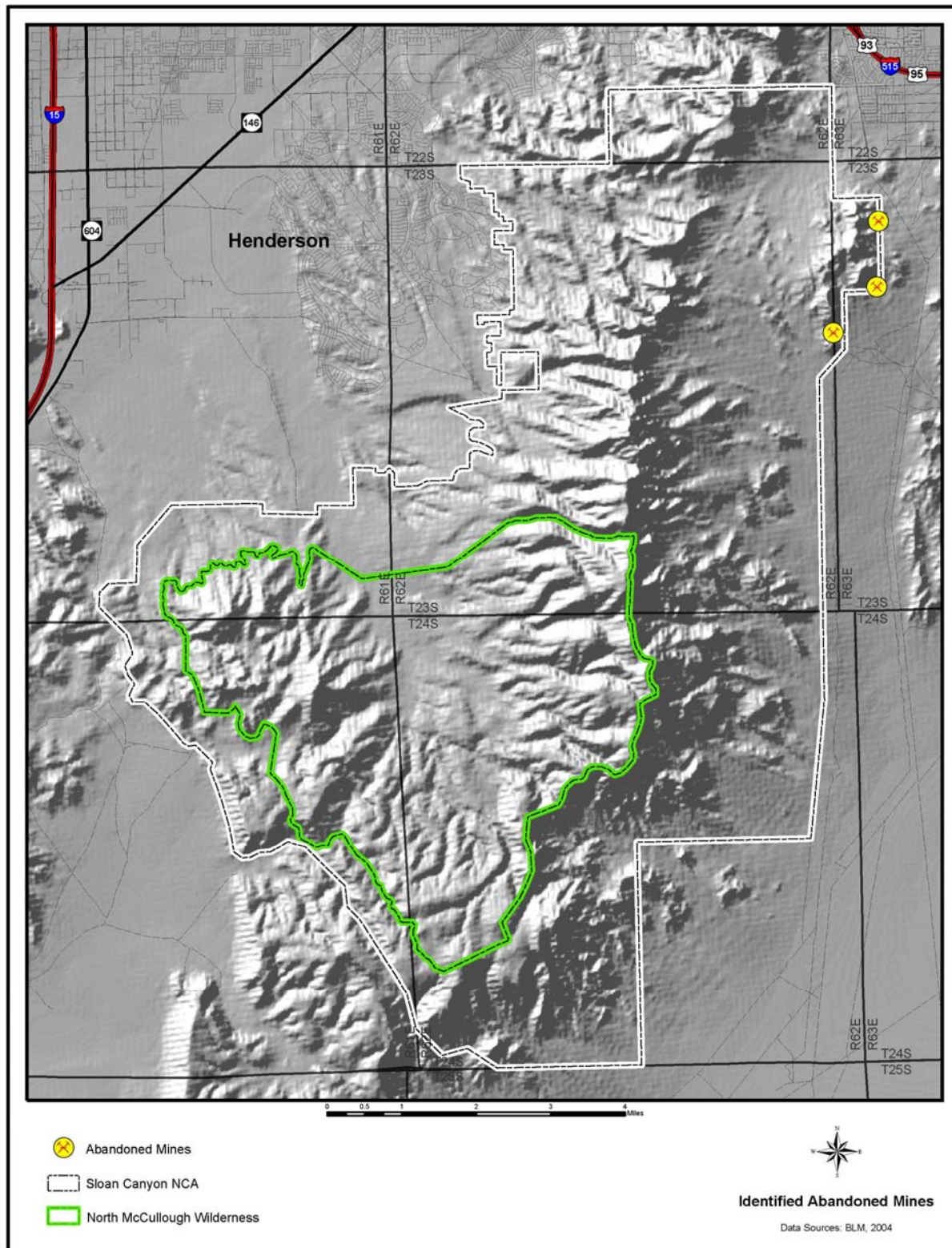


Table 3.10. Status of Abandoned Mine Sites Located Within the NCA

Site Number	Hazard Category	Method Secured
1400	Low	Backfilled
1401	Low	Backfilled
1402	Moderate	Backfilled
1403	Moderate	Backfilled
1404	Minimal	Backfilled
1405	High	Backfilled
1410	Moderate	Backfilled
1411	Moderate	Backfilled
1412	Low	Backfilled
1413	Moderate	Backfilled
1416	Low	Posted with Warning Signs
1417	Low	Backfilled
1427	Low	Backfilled
1466	Low	Barricaded
1467	Minimal	Posted with Warning Sign
1468	Low	Not Secured

Source: Durbin personal communication 2003.

During the Cultural Resources inventory, 11 inconsequential mining-related features such as crude, shallow adits or prospects, and cairns were found, as well as one more substantial site. This last site contains a 20-footshaft and remnants of a check-dam.

3.21 HAZARDOUS MATERIALS MANAGEMENT

At present, there is no known hazardous materials contamination within the NCA (Moran personal communication 2003). The BLM Hazardous Materials Program is responsible for compliance with federal, State, and local management requirements. All non-Department-of-Interior groups whose activities are within the NCA (e.g., claimants, concessionaires, contractors, permittees, and leasees) would be held responsible for compliance with federal, State, interstate, and local waste management requirements. The program is also responsible for aggressively pursuing potentially responsible parties to remediate their contamination of BLM lands and facilities or to recover costs of cleanup.

3.22 SOCIOECONOMICS

The socioeconomic context refers to the social, economic, and cultural connections of nearby communities with the NCA. It incorporates the region's social history and provides a baseline for assessing the potential impacts of RMP alternatives. Activities in the NCA have the potential to affect individuals and communities within Clark County; as such, the county was designated as the socioeconomic study area. Demographic and economic data for the study area have been collected from various sources. In most cases, a 10-year time frame was applied to examine recent trends in demographic and economic parameters for the study area discussed in detail below.

3.22.1 Demographic Characteristics

Unlike much of Nevada and the western United States, Clark County, especially the Las Vegas Valley, is relatively densely populated. Although Nevada's overall population density (18.2 persons per square mile¹) is lower than the national average (79.6 persons per square mile), the population density for Clark

County (173.9 persons per square mile) indicates its metropolitan nature. Clark County has more persons per square mile than either the State of Nevada or the United States, as shown in Table 3.11.

Table 3.11. Population Density of Clark County, Nevada

Geographic Characteristics	Clark County	Nevada	United States
Land Area (Sq. Miles)	7,910	109,826	3.5 Million
Persons per Sq. Mile	173.9	18.2	79.6

Source: U.S. Census Bureau 2003.

Clark County is one of the fastest growing counties in the United States. Between 1990 and 2000, its population more than doubled, increasing by more than 880,000. The City of Henderson, which borders the NCA to the north, grew even faster during that time, nearly tripling its population. The largest population centers in the study area are shown in Table 3.12. All cities within the county are reporting tremendous growth, except Boulder City.

Table 3.12. Population Centers Within Clark County, Nevada

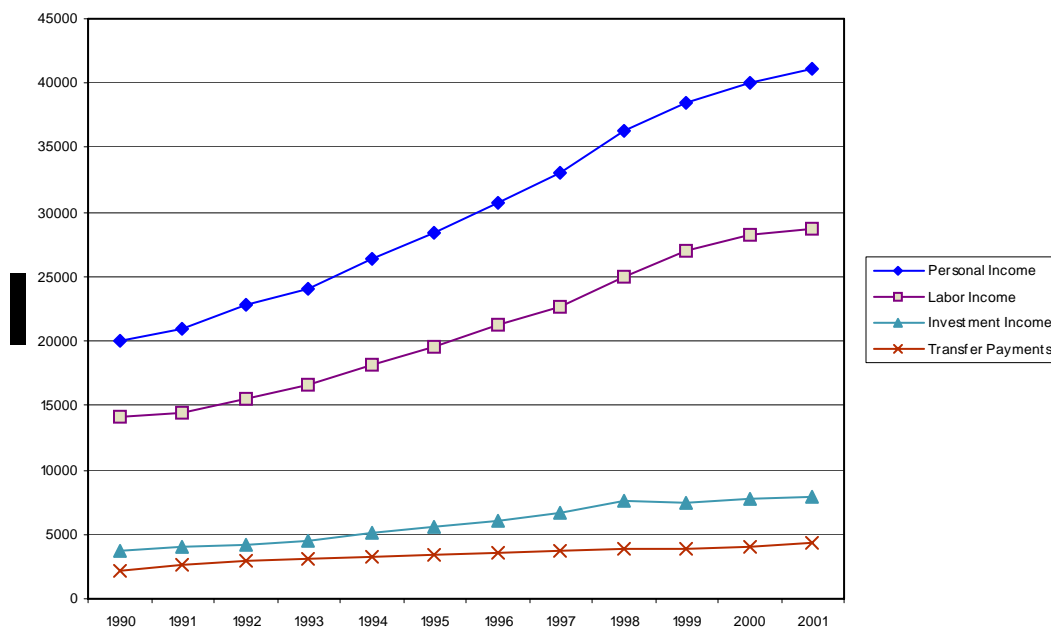
City	Population 1990	Population 2000	Percentage Change in Population 1990–2000
Las Vegas	260,561	483,937	86%
Henderson	71,136	179,558	152%
North Las Vegas	52,387	117,975	125%
Boulder City	13,731	15,042	10%
Mesquite	2,046	9,595	396%
Unincorporated Areas	341,507	587,647	72%

Source: U.S. Census Bureau 2004.

The primary reasons for the population surge include an influx of new residents moving to Clark County to take advantage of increased economic opportunities and relatively low cost of living. Employment in the construction, hotel/casino, education, government, and service industries provides an incentive for people to relocate to Clark County. In addition, many new residents move to the Las Vegas Valley to retire.

3.22.1.1 Per-Capita Personal Income

According to the U.S. Bureau of Economic Analysis, total personal income for Clark County almost tripled since 1990. As shown in Figure 3.25, total personal income increased by more than \$21 billion during the 1990s, representing more than a 100-percent increase.

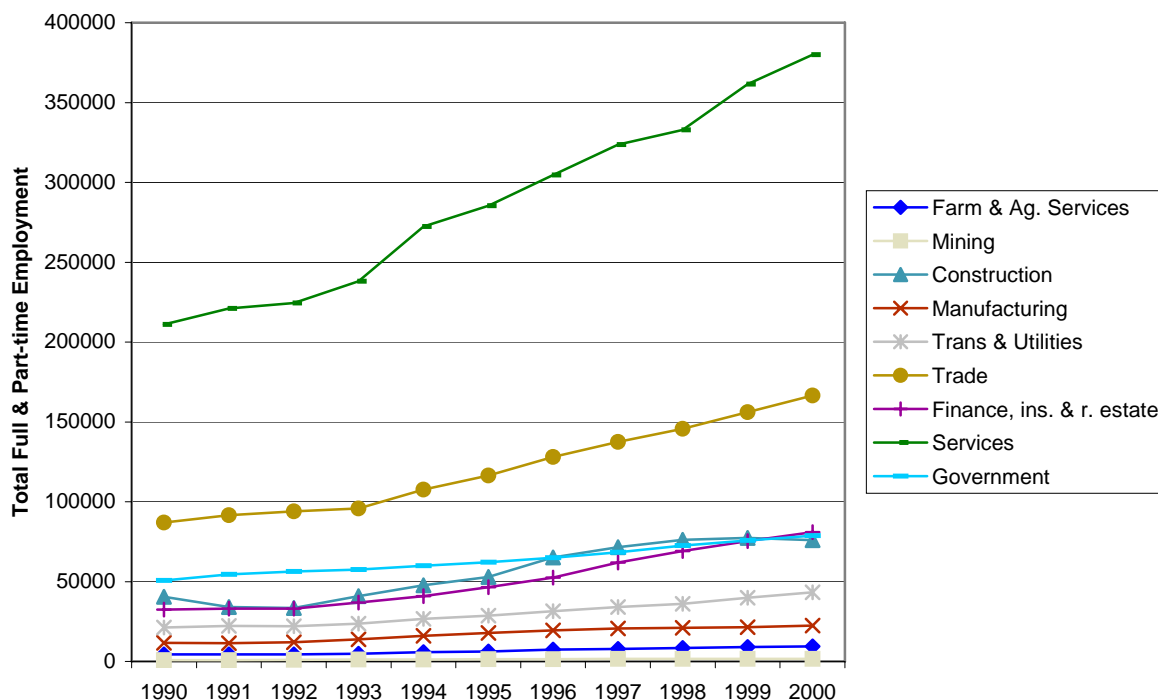
Figure 3.25. Personal Income Trends 1990–2001 (2000\$)

Source: U.S. Bureau of Economic Analysis 2002.

3.22.2 Economic Characteristics

Gaming and tourism are important parts of the economic fabric of Clark County. Gaming-related services employ a large percentage of the populace in the county, and the economic effects of gaming are realized throughout the area. The number of employees in gaming has steadily increased during the last 5 years with the exception of 2001. Overall gaming employment increased by 27,000 jobs between 1997 and 2001 (Nevada Department of Employment 2004c). In addition, gaming employment has consistently constituted about 25 percent of all jobs in the Las Vegas Metropolitan Statistical Area. The number of hotel and motel rooms in Las Vegas and gross gaming revenue has also grown over the last 5 years, and visitation has increased by approximately 4.5 million visitors (University of Nevada Las Vegas, Center for Business and Economic Research 2004).

Employment trends for Clark County by industry for 1990 through 2000 are summarized in Figure 3.26. The service sector leads industry in terms of employment growth having gained more than 168,000 jobs during the 1990s. This sector is followed by trade (79,000) and finance, insurance, and real estate (Fire, Insurance, and Real Estate [F.I.R.E]) (48,000).

Figure 3.26. Clark County Employment Trends by Industry, 1990–2000, SICⁱ data

Source: U.S. Bureau of Economic Analysis 2002

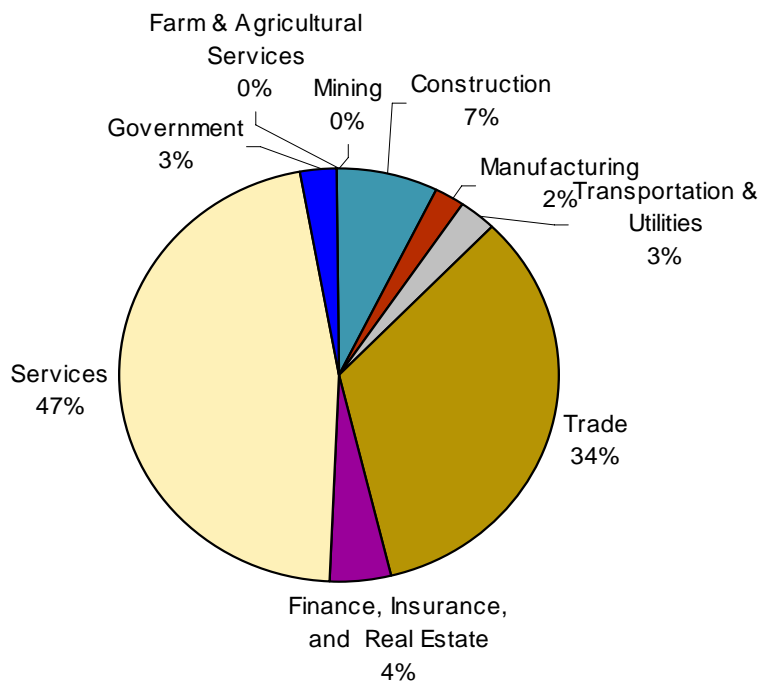
Figure 3.27 summarizes percentage of employment by industry for 2002. Services and trade dominate employment, composing 81 percent of total employment in the county.

3.22.3 Social Conditions

Clark County is one of the fastest-growing areas in the country. As a result, the social fabric is also changing within the county. This section summarizes some of the trends occurring in the study area, including the two closest cities: the City of Henderson and Boulder City.

3.22.3.1 City of Henderson

The City of Henderson was incorporated in 1953 and has grown to be the second largest city in Nevada. It remains one of the top five fastest growing cities in the nation. The City of Henderson encompasses the southern rim of the Las Vegas Valley with access to the Sloan Canyon NCA, Colorado River, and Lake Mead. This picturesque city has been named among the “Top 50 Safest Cities” in the United States (Turner 2000) and among the “Top 50 Kid Friendly” cities in the United States (Population Connection 2001). The city also has nationally accredited fire, police, and parks and recreation departments.

Figure 3.27. Clark County Employment by Industry, 2002, NAICS Data

Source: U.S. Bureau of Economic Analysis 2002

The city started as a bedroom community for Las Vegas but is now becoming one of the nation's top retirement destinations (Turner 2000). The population growth has generally consisted of active seniors in their mid-fifties to mid-sixties or single young adults in their twenties to early thirties (Woodbury 2004). Excluding the lower volume of politically inactive transient population, the city's politics are viewed mostly as "old Nevada," focusing on schools and roads. However, the growing retirement community is beginning to demand services that may strain the social fabric of the City of Henderson (Rothman 2004).

Recreation has been an important thread in the City of Henderson's social fabric. The city's parks and recreation system, which are nationally recognized for excellence, would have the most extensive recreational trail system in the State as a result of the passage and implementation of the 1997 bond issue (City of Henderson 2003). This trail system can be expanded and enhanced through cooperative development with the BLM for the Sloan Canyon NCA. The City of Henderson was also the first city in Nevada to construct a public super-recreation center and aquatic complex; two more were constructed in 2000 and 2002 (City of Henderson 2003).

3.22.3.2 Boulder City

Boulder City is located about 25 miles southeast of Las Vegas, and its western boundary forms the eastern edge of the Sloan Canyon NCA. The incorporated city limits encompass about 200 square miles, although the developed portion of the city is only about 5 square miles (Boulder City 2003).

Boulder City was created for the construction of Hoover Dam between 1931 and 1935 and housed over 4,000 workers. Once the dam was completed, the Federal Government changed the basic function of the city to the headquarters of several government agencies involved in the dam's water and power

operations. Boulder City was supervised and regulated by the Bureau of Reclamation, and the Federal Government owned city land.

In 1958, the Federal Government passed the Boulder City Act, which established Boulder City as an independent municipal government. Under the act, the Federal Government turned over the existing town site, about 33 square miles of land, and the utility system to the residents. The City Charter prohibits gambling, which makes Boulder City unique as the only city in Nevada where gambling is illegal.

In 1979, Boulder City citizens passed a referendum that instituted a controlled-growth ordinance. This controlled-growth ordinance was enacted in response to the rapid growth of the city and to preserve the utility systems (Boulder City 2003). Since the inception of the controlled-growth ordinance, the growth of the community has been limited to about 3 percent per year. However, in actuality, the city's growth rate has remained significantly below the 3-percent cap and has declined from 2.7 percent in the 1980s to 1.76 percent in the 1990s (Boulder City 2003). This is primarily because much of the privately held land within the city has already been developed, and most of the land was not subject to the controlled-growth ordinance.

In 1995, the city purchased more than 100,000 acres of the former Eldorado Valley Transfer Area from the Colorado River Commission for public recreation, solar energy uses, and a desert tortoise reserve. This addition brought the city's total land area to about 200 square miles.

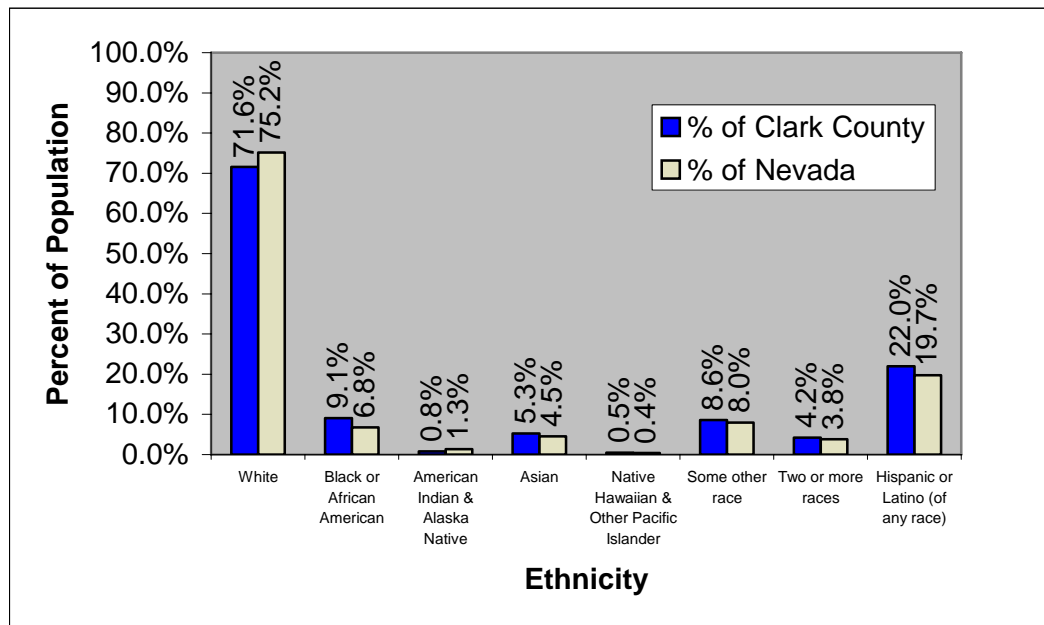
3.23 ENVIRONMENTAL JUSTICE

Federal agencies must identify and address disproportionately high and adverse effects of federal actions on the health or environment of minority and low-income populations (Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations).

Relevant census data for Clark County were collected to determine whether the populations residing within the study area constitute an "environmental justice population" by meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status.
- The percentage of population of minority or low-income status is at least 10 percentage points higher than for the entire State of Nevada.

Figure 3.28 shows distribution of the population by ethnicity for the study areas and the State of Nevada during 2000. Only slight differences in ethnic composition exist between the study area and the state. The study area reported a slightly higher percentage of minorities than the statewide figures, including Black or African American and Hispanics or Latinos, of any race. The percentage of other ethnic groups is small and very similar to Nevada as a whole. Although no Native American lands border the NCA, approximately 0.8 percent of Clark County's population is American Indian and Alaska Native. Clark County does not constitute an "environmental justice population" because it does not meet either of the criteria listed above.

Figure 3.28. Population Ethnicity for Clark County and State of Nevada

Source: U.S. Census Bureau 2003

The BLM consulted with 11 Native American tribes and 4 Paiute bands that claim ancestral ties to, or traditional cultural use of, the lands included within the NCA. The tribes identified one culturally significant place, the Sloan Canyon Petroglyph Site within the NCA. Sloan Canyon is listed on the NRHP as an archeological site, and it also meets Criterion A as a Traditional Cultural Property.

Table 3.13 summarizes the median household income for Clark County, Nevada, and for the United States for 1999. This table shows that the median household income in Clark County was above the State and national levels for 1999. Poverty levels for each area are summarized in Table 3.14. The percentage of persons considered living below the poverty level was slightly higher in Clark County than throughout Nevada but below national poverty levels. These two tables suggest that Clark County does not have low-income populations that could be affected by BLM actions. Nonetheless, smaller populations of minority and/or low-income persons could be affected by BLM actions.

Table 3.13. Median Household Money Income, 1999

Clark County	Nevada	United States
\$44,616	\$44,581	\$41,994

Source: U.S. Census Bureau 2003

Table 3.14. Percentage of Persons Below Poverty, 1999

Clark County	Nevada	United States
10.8%	10.5%	12.4%

Source: U.S. Census Bureau 2003

U.S. Census Bureau Track Data were used to determine if smaller populations of minority and/or low-income persons would be affected by BLM actions at the Sloan Canyon NCA. The Tracks surrounding

the Sloan Canyon NCA are Clark County, Nevada, Tracks 53.31, 53.39, 53.45, and 55.01. The entire Sloan Canyon NCA is contained within Clark County, Nevada, Track 57.10. None of the smaller populations within the Track Data meets either requirement to be classified as an “environmental justice population.”

The Sloan Canyon NCA is approximately 48,438 acres or 76 square miles. Clark County itself, by contrast, is about 7,910 square miles. The NCA constitutes only 1 percent of the land area in Clark County, and the county itself accounts for 7 percent of the land area in the State of Nevada.